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A D D R E S S  
TO THE  
ROYAL GEOGRAPHICAL SOCIETY  
OF LONDON;

*Delivered at the Anniversary Meeting on the 24th May, 1852,*

BY SIR RODERICK IMPEY MURCHISON, G.C.St.S., M.A., F.R.S.,  
MEMBER OF THE ACADEMIES OF ST. PETERSBURG, BERLIN, COPENHAGEN; AND  
CORR. INST. OF FRANCE, &c.,  
PRESIDENT.

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GENTLEMEN,—Succeeding to a President who combined in his own person the powers of the astronomer, archæologist, and mechanician, and who as a navigator had successfully surveyed large maritime regions, I cannot but feel how inferior are my special qualifications to preside over you. But as geography, in its comprehensive range, embraces so much of science and art, you have, doubtless, accepted my services under the belief that in my own walk I may perchance be able to do something to advance our acquaintance with the world's surface, and that, by devoting myself warmly to your cause, I may strengthen the bonds of good fellowship by which we have been held together. At all events, as you have once more had recourse to an old friend who pretends not to wield other instruments than his hammer and compass, and whose chief knowledge of terrestrial phenomena is confined to the earth's outline and subsoil, you already know all that can be obtained from him.

Let me preface what I have to say on the progress of our science by at once expressing the gratification I experienced when entering upon my duties at our last anniversary. I found that our geographical vessel had been so ably piloted through the shoals with which she had been surrounded, and that her crew (augmented by many stout hands) was in so healthful and sound a condition, that it

would be easy for me to steer her onwards with the same genial trade-wind in which her good commander had transferred her to me.

I have, indeed, true pleasure in saying, that the present flourishing condition of the Royal Geographical Society is mainly due to the skill and moral courage with which Captain Smyth conducted your affairs, supported as he was by an efficient Council, and our zealous Assistant-Secretary and Editor, Dr. Shaw.

The movement in the right direction has, I am happy to say, been fully sustained in the past year. Numbering 611 at the last anniversary, our list has now swelled to 645 members, besides eleven candidates whose names are now announced. We have no debts, and our income has largely increased. Our spirit is, I am confident, as good and hearty as that of any society in the Metropolis; and if this "*esprit de corps*" should have been, in any degree, increased by my efforts to engage you to meet together in my own house with other men of science, literature, and art, one of my objects will have been attained.

But notwithstanding many signs of prosperity, we have not yet obtained that befitting place of meeting which has so long been our great desideratum, and in which we can conveniently assemble, and make a proper use of our numerous collections of maps and charts. Last year, when the afflux of foreigners to the Great Exhibition took place, the geographers of Britain were—thanks to the Principal and Professors of King's College—enabled to assemble in a convenient hall; and through an equal degree of liberality on the part of the noble President and the Managers of the Royal Institution, we have, during the greater part of this season, been gratified with the use of their theatre.

When I formerly presided over you, I endeavoured to impress on the then Minister of the Crown, the desirableness of granting the same amount of support to the Royal Geographical Society, in the use of rooms, which had been awarded to some other scientific bodies. But, in order now to bring our claims more prominently before Her Majesty's Government, I recently presented, on the part of the Council, a memorial to our Vice-Patron, Prince Albert, requesting that His Royal Highness, with the love of science which characterizes him, would be pleased to ask the Queen, our gracious Patron, to place us in a position, in which the Royal Geographical Society might open out its useful resources to Her Majesty's subjects. Indicating how much we might accomplish by researches and publications, if only relieved from the cost of most inadequate apartments, I pointed out to His Royal Highness, that so small was our present meeting-room,

that the valuable framed maps which had been presented to us by the Emperor of Austria (after due exhibition in the great Crystal Palace) could not be introduced, and had in consequence remained upon the walls of our staircase! It was further represented that, from its connexion with the Foreign, Colonial, and other offices of Her Majesty's Government, and from the useful nature of its publications in developing new marts of commerce and industry, this Society was entitled to, at least, that limited measure of public assistance which had been meted out to other scientific bodies.

Again, our Royal Vice-Patron was informed that, if we should be favoured by the grant of apartments, or an equivalent consideration, the Society would repay its obligation to the country by rendering one of its rooms a "map office" of the British nation, in which all persons might have access to maps, charts, and plans, many thousands in number.

Let us hope that this proposal will have its due weight; for surely England, with her vast colonies, and with interests pervading so many regions of the globe, ought to be furnished with at least one good general map office: and this we offer to the public, at a cost to them of no more than the salary of an official clerk, or at no cost at all if any vacant apartment can be found for us.

I firmly believe that the enlightened economists of our country will cordially support in Parliament a moderate grant of a few hundred pounds annually for such a truly national object; and, at the same time, I feel confident that the petition which in your name I have had the honour to present, could not have gone into the hands of any one more anxious to promote its success than the illustrious Prince to whom it is confided.

#### OBITUARY.

In the performance of the unwelcome task of bringing before you the names of the members, who have been taken away from us in the past year, I shall only especially allude to those who have been connected with us by scientific ties.

Vice-Admiral Sir Charles Malcolm, our late Vice-President, so beloved by you all, died at Brighton on the 14th of last June, of an attack of paralysis, in his sixty-ninth year. He was the tenth and youngest son of a Dumfries family, of which, it will be remembered, three of his brothers attained distinguished eminence as warriors and scholars—namely, the late Sir James Malcolm, K.C.B., colonel of the Marines; Admiral Sir Pulteney Malcolm, G.C.B.; and General Sir

John Malcolm, G.C.B., the historian of India, and former envoy to Persia.

Sir Charles entered the Royal Navy in the year 1791, and afterwards sailed to India in the 'Fox' frigate, commanded by his brother Sir Pulteney, where he obtained a lieutenancy, and became a commander in 1801. It is not within my province to follow him through his subsequent naval career when in command of the 'Eurydice,' 'Narcissus,' 'Rhin,' and other ships, in each of which, I am informed, he won golden opinions; but I may announce that his appointment to the superintendence of the Bombay Marine, to which he gave the more appropriate designation of "Indian Navy," was an event of some import to this Society, from his warm patronage of every branch of naval knowledge and research. In the ten years, during which he held that responsible post, he instituted various extensive and important surveys; and he was especially anxious to advance our acquaintance with the N.E. regions of Africa, and to open the commerce of the Sómáli coast to British enterprise. In instituting the Geographical Society of Bombay, to which he communicated several memoirs, he manifested great attention to our interests; and when Captain John Betham, of the Indian Navy, published his concise method of obtaining the latitude by the Pole star, he dedicated the work to Sir Charles as a sincere tribute to his promotion of science.

In his later years Sir Charles was distinguished by his untiring attention to this Society; to the Ethnological Society, of which he was the President; and to various professional institutions and charities. Indeed, it may be truly asserted that he was a gallant, liberal, and estimable British officer. No man ever more effectually carried his heart into every undertaking destined to benefit his fellow-creatures; and, knowing as I do the real value of his active co-operation in maintaining our interests, whether literary or material, I declare that the Society could not have sustained a greater loss than in the decease of the good Sir Charles Malcolm.

Mr. Bartholomew Frere, who was born in 1776, was a brother of several able and variously distinguished men; one of whom, the Right Hon. J. Hookham Frère, was the intimate friend of the illustrious Canning. Educated at Harrow, and having gained high classical honours at Cambridge, Mr. B. Frere served successfully as a diplomatist for many years in various countries, and was for some time the Chargé d'Affaires of the British Government at the Ottoman Porte. As the representative of the interests of the African Association, a body which joined us soon after our origin, he was for nearly twenty

years a member of our Council, of which, being a well-read geographer and a first-rate scholar, he was a very efficient member ; his just, calm, and perspicuous views having frequently proved of great service to us in the preparation of memoirs for the press.

Every one who knew how these accomplishments were united, in Mr. B. Frere, with the finest qualities of the heart, a playful wit, and the most engaging manners (*mitis sapientia Læli*), will join with me in this brief but genuine tribute of regard to the memory of our learned and estimable colleague, and in the expression of our deep regret that he has been taken from us.

The late Earl of Derby was a nobleman, through whose munificent exertions the science of natural history has most largely benefited, and of which he was a worthy representative as a Trustee of the British Museum. His menagerie and museum at Knowsley Park were indeed worthy of an English Earl, and may be said to have rivalled, if they did not excel, the collections made even by sovereigns ; the live animals amounting to 1617 individuals, and occupying 100 acres of land. It is not my province to enumerate the great additions which the Earl of Derby made to our acquaintance with the races of creatures which inhabit distant lands ; but I may state that, in his zeal for their acquisition, he not only spared no expense, but also employed men of capacity to procure them, who occasionally contributed new geographical data. Thus, his zoological and botanical collectors in Africa, the Honduras, and the Rocky Mountains, were directed by him to obtain whatever information might be within their power for communication to the Royal Geographical Society ; and among the contributions thus offered to us, through the medium of Mr. J. E. Gray, a journal with a map of a part of S. Africa, explored by Mr. Burke, may be specially mentioned.

As long as his health permitted it, the late Lord Derby was an active President of the Zoological Society of London, to all the members of which he endeared himself by his kind and conciliatory manners. To that body he was always a most liberal contributor, spending large sums of money annually in new illustrations and in the augmentation of its library ; and he left to it at his decease gifts of most valuable animals : his Lordship's museum of preserved birds and quadrupeds was bequeathed to the town of Liverpool.

The late Lord Viscount Melville, though not a man of science, must be specially alluded to on this occasion, as having been the First Lord of the Admiralty, under whose auspices all those earlier Arctic Researches which were advocated by Sir John Barrow were liberally fostered and successfully carried out ; his name has therefore been most properly

affixed to the largest and most interesting of all the Northern Islands discovered by Sir Edward Parry. Lord Melville was a rightminded and benevolent man, who administered the important charge committed to his care with fidelity and ability; in private as in public life he was universally respected.

Commander Frederick Edwin Forbes, R.N., an active young officer, died on the 25th of March, on board Her Majesty's ship 'Tortoise,' at the age of 34 years. He entered the Navy in 1833, served through the war against China, and afterwards on the Coast of Africa, where, in the command of the 'Bonetta,' he captured several slavers, and discovered the curious written Negro language now known as the Vahie or Vei, which was published in the 20th vol. of the Journal of this Society. As late as the 31st of December of last year this eager member of our body wrote to Dr. Shaw, informing him that he had sent "An Outline of Abbeokuta, with specimens," to the Admiralty, which he hoped would be transmitted to this Society. To this he added, "We are here on the eve of a tremendous fight. I am opposed to the King of Dahomey, and am General-in-Chief of the Egbas, with 40,000 soldiers, whose chiefs call me Babba, *i. e.* Father." Like his late friend Mr. Duncan, he was attacked by the dysentery, and although at once moved on to the coast and placed on board ship, he expired two days after leaving the land. Commander Forbes' work on 'Dahomey and the Dahomans,' published in 1851, was presented by him to the library of this Society shortly before he sailed from England to join the 'Penelope' flag-ship, on special service from the Foreign Office.

In addition to those members who have thus been mentioned, we have further to regret the loss of the following gentlemen; viz. Mr. H. Broadley, M.P.; Mr. Wade Brown, M.A.; Rev. J. Edmonston; Mr. James Goding; Mr. R. Hollier; Mr. A. Maxwell; Hon. F. Ponsonby; Capt. R. Russell, R.N.; and Mr. E. J. Wallace.

Of Foreign Honorary Members we have lost four, whose names will live with credit through future ages—Walckenaer, Schouw, Inghirami, and Clarke.

Charles Athanase Baron de Walckenaer, who died recently at Paris at an advanced age, was a member of the Academy of Inscriptions and Belles Lettres (of the Institute of France), and of which during the last 12 years he had been perpetual secretary. Though he was the author of works which have procured for him an European fame as a writer on geography, it is to be noted that his first appearance in the world of letters was as a naturalist, and by publishing works on

the Arachnidæ, which gained him the notice and friendship of Cuvier. Soon, however, abandoning that career, M. de Walckenaer edited the first edition of Azzara's '*Voyages dans l'Amérique Méridionale.*' Indeed, we learn from himself, that, amidst all his accomplishments, his real passion was comparative geography, and of this he gave a most successful proof in his remarkable work entitled '*Géographie Ancienne, Historique et Comparée, des Gaules Cisalpines et Transalpines*,'—a work which obtained for him one of the great prizes of the Institute, and subsequently a place in that illustrious body. Eminent geographers, such as Delisle, D'Anville, Rennell, Gosselin, and Vincent, had admitted the vast difficulty of comparing ancient and modern geography, arising in a great degree from the uncertainty as to the measures of length referred to by classical authors ; but our perspicuous and indefatigable associate overcame all such obstacles.

M. de Walckenaer published other works on ancient and modern geography, an historical view of the East, Polynesia, and Australia, on the interior of North Africa, besides a general history of voyages and travels and many detached memoirs.

He was also an accomplished biographer, having given to the world the '*Life and Writings of La Fontaine,*' the '*Life of Horace,*' and the '*Memoirs of Madame de Sévigné,*' by the last-mentioned of which works he is perhaps best known to the general reader. The first lines in it show how well he could impart the artistic feeling of a geographer to a literary production ; for the old castle of Bourbilly, in which the inimitable authoress was born, is there placed before us by the hand of a master, as surrounded by its meadows, slopes, rocks, and river.

M. de Walckenaer, who had been employed in the civil administration of Napoleon, became Secretary-General of the Department of the Seine at the Bourbon restoration, and was created a Baron in 1830. He was one of the most frequent attendants at the meetings of the Academy, of which he had been a member since 1813, and was, when he died, a Vice-President of the Geographical Society of France.

Professor Schouw, of Copenhagen, another of our foreign members who has just departed this life, had justly attained the very highest celebrity from the light which his works have thrown upon the geographical distribution of plants, and on the effects of climate on animal and vegetable life. The mere enumeration of his publications which are in the library of this Society would be sufficient to prove how eminently he was entitled to the honourable place we assigned to him among geographers, and which, in the opinion of our eminent associate

Mr. Robert Brown, the President of the Linnean Society, he most fully merited.

That Denmark can send forth admirable botanists we well know, in happily possessing among us Dr. Wallich, the historian of the plants of Hindostan; but never has she produced a man whose name stood so high in general reputation for the value of his broad philosophical views on the geography of vegetation, as the truly eminent Schouw.

In foreign countries, where men of science are found to be occasionally useful members of the Government, and are not almost "tabooed" as in our own land, Professor Schouw was not only a Councillor of State, and a representative of the people, but also the President of the Danish House of Commons, as well as the Director of the Royal Botanical Garden of Copenhagen.

Proud, indeed, may the small kingdom of Denmark be to have produced such contemporaries as Oersted and Schouw; and grievous is it to reflect that they have departed this life in the same year. Although the illustrious philosopher Oersted was not a member of our Society, and did not take a part in the details of our pursuits, his discovery of the intimate relations between electricity and magnetism constituted not only the basis of the subsequent discoveries of our own Faraday, but also connects itself with a large branch of physical geography, which in the hands of Sabine, Dove, and others, has opened out a vast field of inquiry, and has already obtained grand and important results.

As few philosophers ever lived who more merited a recompense than Oersted, so it is to the infinite credit of the late and present sovereign of Denmark that he enjoyed every honour and comfort to which a leader of science could aspire; one of the last proofs of which was the conferring on him, by the reigning King, a residence near Copenhagen, which has worthily passed to my esteemed friend, Professor Forchhammer.\*

Would that the venerable, good, and eminent philosopher, who was the chief ornament of the meeting of the British Association in 1846 over which I had the honour to preside, had survived a few years longer, if only to enable some of his foreign friends and admirers to visit him in a residence worthy of him. I shall, indeed, be ever proud of having been honoured with the intimacy of this illustrious Dane, who but a very short time before his death had forwarded his philosophic work, the 'Spirit in Nature' (*Aanden i Naturen*), to Dr. Norton Shaw, in the hope that it might be translated into our language.

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\* See a Memoir of Hans Christian Oersted, by Forchhammer, read before the Royal Danish Academy of Sciences, Nov. 1851.

The Padre Giovanni Inghirami of Florence, one of a noble family of Volterra, and brother of the distinguished expositor of Tuscan antiquities, was the author of an excellent map of Tuscany which I have found to be of great service in geological explorations of the Apennines; of numerous papers on astronomical subjects in Zach's Correspondence, amongst which may be mentioned, connected with our subject, his calculations for occultations, for M. Rüppell during the geographical labours of that eminent traveller in Africa; and of a Celestial Atlas of a portion of the Heavens: he was also highly esteemed by my predecessor for his geodetical skill, and for contemporaneous observations during Captain Smyth's survey of the Mediterranean. His numerous publications may be known to most of you, but his treatment of a terrestrial condition, which he called lateral refraction, was, I am told, entirely new. "You are aware" (Captain Smyth writes to me) "that the refraction of light by the atmosphere is very great when the visual ray is nearly horizontal, and hence arise great errors in the measurement of angles, whether the observed objects are in the same level or not. These errors were generally palliated by an empirical law, or avoided in a degree by seizing the most propitious moment for observing. In this state of the question, Inghirami suggested corrections applicable for terrestrial refraction in the varied states of rarefaction or of moisture, in which the lower strata of the atmosphere are found."

The Padre Inghirami, who died recently at Florence, had for many years been at the head of the distinguished religious Order of the Scolopii, which has produced many eminent scientific men, the object of the Order being public education on a liberal basis: hence their persecution by the Jesuits.

The hand of death has been sometimes extended to our honorary foreign members without our being aware of it, and such has been the case in relation to General W. Clarke, of Missouri, whose name has accidentally been retained on our lists, though he died at his residence at St. Louis, in that state, in September, 1838. Our honorary and esteemed associate of the same great nation, Mr. Schoolcraft, has called my attention to this point, and has enabled me to give the following brief sketch of the career of his distinguished countryman.

General Clarke was of English descent, his father having, it is believed, commanded a troop of British horse during the American war. Possessed of a strong and vigorous mind, and being of commanding stature, he was a fine representative, mentally and physically, of the Anglo-Saxon race in America. His celebrated journeys

with Mr. Merriwether Lewis to Oregon opened out the career of geographical discovery in the vast area of the Upper Valley of the Mississippi, where cities and states are rapidly rising to cover the wildernesses and buffalo-grounds first explored and described by our deceased associate. General Clarke filled some offices of the highest trust under the Federal Government, was much respected through life, and exercised a beneficent and controlling influence over the Indian tribes which extend to the foot of the Rocky Mountains.

## ARCTIC RESEARCHES.

When quitting the chair of the Society in the spring of 1845, I announced the departure of my valued friend, Sir John Franklin, on his third expedition to determine the problem of a north-west passage: I then felt the fullest confidence, that everything which could be mastered by human skill, and a chivalrous devotion to the object, would be accomplished by that eminent navigator and his associates. Alas! that seven years should have elapsed without tidings of them; but honour to the Englishmen who still cling to the hope that these brave men, or a portion of them, may yet be discovered, and who cheer on the new expedition which has just left our shores under Sir Edward Belcher and Captain Kellett—men whose resolution, knowledge, and experience, well qualify them to carry out their arduous mission of tracking their long absent friends. On the last day which he passed on the shores of N. Britain, Sir E. Belcher thus wrote to me from Stromness:—"One feeling seems to pervade us all—a stern resolve to deserve a little of what has been too freely supposed we may merit. Under the blessing of God, we hope to prosper; but our predecessors have left us a hard game to play. I can, however, foresee much interesting matter for the Geographical Society, even if the great object of our mission be not successful."

As it is not my part to advert, on this occasion, to the efforts which have been made in former years to obtain intelligence of the missing expedition, I will simply take up the subject from the point at which my predecessors left it.\*

The Reports of the recent Arctic Committee, composed in great part of eminent northern navigators, have elicited graphic accounts of the services performed by Captains Austin and Ommanney, and the officers under their command, in exploring the bays and headlands beyond Barrow Strait. The diaries of the officers who were detached

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\* See a very useful compendium of the recent "Arctic Searching Expeditions," by our associate, Captain Mangles, R.N. Second Edition. 8vo.

with sledges to search in different directions from their winter headquarters, and particularly the lively and highly descriptive work just published by Lieut. Osborne, afford pregnant proofs of what can be accomplished by British officers and seamen under severe privations.\* In conjunction with the journeys of Dr. Rae, of which I have already spoken in presenting our Founder's medal, they have satisfied us that Franklin's expedition could scarcely have passed to the south or west from Barrow's Strait; and as the greater part of Baffin's Bay has been tracked, we are now more than ever led to believe that, if not submerged, the gallant explorers must really have passed through Wellington Channel. The chart of the Discoveries in the Arctic Sea up to 1851, recently published by the Admiralty, is, in fact, the document on which geographers may scan the merits of those zealous men. By reference to it, and to a general map prepared by Arrowsmith, we now see at a glance how much new territory was delineated by each of the officers detached by Captain Austin, and also how far Captain Penny extended his researches to the north of Wellington Channel into what is termed the Queen's Channel and Penny's Strait in the Admiralty document. The last-mentioned exploration of an experienced polar seaman, in sketching the outline of grounds between which Sir Edward Parry saw an open channel of water in the year 1819, when combined with the relics found at Beechey Island and Cape Riley, has also led to the belief, which is prevalent, that Franklin really passed through Wellington Channel.

One portion of the new expedition (we are now informed by the published Admiralty instructions), after making a searching examination for despatches or relics of Franklin between Beechey Island and Cape Bowden, will, if circumstances require and permit, penetrate northwards by the Wellington Channel; whilst another portion will proceed to Melville Island, and, after wintering there, make a spring excursion. In this way it is supposed the explorers may detect and follow up the track of the missing navigators, or perchance succour Captain McClure, who forced his way into the ice from Behring Strait, purposing to reach the north shores of Melville Island to the north-east. If, on the other hand, possession should in the first instance be obtained, at or near Beechey Island, of any despatches of Franklin intimating his intention of returning from that point, then, of course, the expedition will also

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\* Of the officers under Captain Austin who travelled in sledges, Lieut. (now Commander) M'Clintock accomplished the greatest distance, viz. 760 miles along the south coast of Melville Island. This, however, was exceeded by Captain Penny, who, according to Arrowsmith's map, travelled 930 miles in exploring northwards from Wellington Channel.

return, endeavouring by the way to determine the fate of our brave countrymen, who in that case may have perished in Baffin's Bay.

Whilst these efforts are being made from the north-west, our recent researches from the north-east by Behring Strait have, I regret to say, been confined to sending out stores by Captain Macguire, with instructions to advance the 'Plover' with some of those supplies beyond Cape Barrow, so as to afford a support to the crew of the adventurous navigator McClure, who, having out-sailed his Commander, Capt. Collinson, had passed to the north-east, and has not been heard of since he entered the ice.\*

As there exists no clear evidence of the route taken by Sir J. Franklin, we cannot speculate with confidence on any one line of research being more likely to succeed than another. The presumptive evidence, however, being much in favour of his having forced through Wellington Channel, after having waited for some time at or near Cape Riley, the Admiralty has judged wisely in directing the chief efforts to that point. At the same time, it is much to be regretted, that a simultaneous national endeavour could not have been made by the employment of a *steam-vessel* from the side of Behring Strait, and by extending the researches of Captain Kellett in his sailing vessel, the 'Herald,' beyond the island named after her. That gallant officer having all along been of opinion that an application of steam power in Behring Strait might prove successful, in enabling the explorer to work round to *meet* Franklin through lanes of water between Siberia and the northern packs of ice, until an open polar sea might be reached, it was with true gratification that I made every exertion to forward two successive projects, in which the Council and Members of this Society took as deep an interest as Lady Franklin and myself.

Many persons who know that it was the resolve of the inflexible Franklin to penetrate, if possible, by the north-west into an open polar sea, and to navigate in it until he reached the longitude of Behring Strait, have thought that, if he really passed through Wellington Channel, and did gain such a sea, he may have made considerable progress westward; and that then, if compelled to abandon his ships, he might have taken refuge on land, where some of our countrymen may

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\* Capt. McClure intended (as expressed in a letter to Sir George Back, dated July 28, 1850, from Kotzebue Sound) to take the first opening in the ice, and try for Banks Land, being careful not to be caught in the bight to the S.E. near Boothia: his next object being to get to the northward of Melville Island, and afterwards to try to pass to the S.E. by the Wellington or some other channel, all of which operations, as this brave man estimated, might be so accomplished as to enable him to return home, at latest, in 1853.

still be living on the natural produce of the region, but cut off from all communication with countries to which we have access.

It is this idea, mainly founded upon the character of Franklin, which has induced many geographers to attach value to such an hypothesis. On this ground we supported the bold project of Lieut. Pim, one of the officers of Captain Kellett, who proposed a plan of research by which he hoped to go far beyond the tracts formerly explored by Admiral Wrangel. Travelling over Siberia to the extreme edge of the Russian settlements (a journey which occupies the post six months), he designed to traverse the wilds of the Tchukchi race, and from their shores to pass over channels of water in India-rubber or skin canoes, to tracts inhabited by the most northern Eskimaux, and there endeavour to learn the fate of his countrymen.

When this arduous scheme was first mentioned to me, I foresaw considerable difficulty, though not all the obstacles with which it was beset; but as at that time the intrepid young officer had obtained the approval and countenance of Her Majesty's Foreign Secretary,\* and was certain to proceed to St. Petersburg, I felt it to be my duty, as your President, energetically to support the enterprise. I did so, however, on the express condition (and my letters to the Imperial authorities were so penned) that the expedition must be entirely arranged and executed by the Russian Government. I was led to hope that, as thirty years had elapsed since their voyagers, Wrangel, Anjou, and Matiushkin, had explored those inhospitable snowy deserts, the Imperial Government might wish to renew and extend such inquiries, and thus become better acquainted with the outlines of north-eastern Asia.

This view was warmly supported by the illustrious Humboldt and by Adolf Erman; and Colonel Sabine, having instructed Lieut. Pim in the method of taking magnetic observations, stated to me that a few of these correctly made in the north-east of Siberia would be worth the expedition, for their important bearing on terrestrial magnetism. The first Minister of the Crown† had granted a sum in aid, and everything seemed for a while propitious; whilst the King of Prussia bestowed marks of kindness on the young officer as he passed through Berlin; and Sir G. Hamilton Seymour, the British minister at St. Petersburg, most kindly entertained him.

The reports, however, of the Russian authorities to His Imperial Majesty, particularly a document prepared by Admiral Matiushkin,

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\* Viscount Palmerston.

† Lord John Russell.

were adverse to the renewal of any such enterprise. They represented that, in order to enable travellers, furnished with instruments and interpreters, to traverse the ultra-Siberian country of the Tchuktchi, previous arrangements of eighteen months would be required to assemble the necessary quantity of dogs and sledges; and that, as the former expedition had, by withdrawing the use of many of these animals, produced fatal diseases among the natives and a great mortality, such an extraordinary effort ought not to be renewed without motives of overwhelming necessity.

In short, being informed that such an expedition could not be put in motion before March, 1853, and being aware of the responsibilities which they would be led into, whether as respected their relation to the native tribes, or to the young British officer whose life they thought would be uselessly perilled, the Imperial Government declined to co-operate in the project. At the same time they gave Mr. Pim permission to travel in any direction he pleased through Siberia; but by my own advice and that of other friends he reluctantly abandoned the scheme. On his return from St. Petersburg he immediately volunteered to serve again under his old commander Captain Kellett, and he has now sailed with the Arctic expedition; not, however, before he had, with the sanction of our Premier, handed over the balance of the sum advanced to him to help on another expedition to Behring Strait. Let me further state, that whilst he was in Russia, our countryman received marked attention from the Court, and from the Imperial Geographical Society, and even had an interview with the Emperor. And, if this scheme was frustrated, I must assure you that his Imperial Majesty has not ceased to desire to afford every countenance to those expeditions in search of Franklin which, in his opinion, offer any chance of success.

For example, Captain Macguire, R.N., having been suddenly ordered off to take command of the 'Plover' in Behring Strait, and being charged to leave a quantity of his supplies at the Russian Fort of Michaelowski, it became necessary to have authority to do so, and instantly on application to Baron Brunnow, who was well acquainted with the wishes of the Emperor, the requisite letters were furnished. Again, when requested to succour the private expedition to Behring Strait, which was to have proceeded under Mr. Beatson, the Imperial Government cordially responded, and furnished passports and recommendations to the Imperial officers on the Asiatic and American shores of that sea, for the use of this private expedition.

I am thus led necessarily to make the painful announcement that this

last mentioned enterprise, for which many of us have subscribed, has been suspended, and that the hope of entering with any vessel far into the ice this season, between Siberia and the “unknown” north, is at an end. Want of adequate means, and the unexpected personal embarrassments of the ingenious commander, to which it is unnecessary here to refer, have prevented the departure of the ‘Isabel,’ *the only screw-vessel* which had been prepared for service in a quarter where, in the opinion of Captain Kellett and others, she was admirably qualified, from her form, build, and fittings, to accomplish the happiest results.

Up to a late date I entertained a hope that the Board of Admiralty, which, with the kind sanction of the Noble Duke at its head, had supplied the ‘Isabel’ with pemmican, certain other provisions, and coal, and had directed a steam tug to help her out to sea, might think it desirable to employ this good vessel in their own service, by despatching her to Behring Strait. But as this plan does not enter into the views of our naval chiefs, let us hope that they may yet think fit to employ in some way this ship, if only to carry out that additional quantity of provisions, with which she is already stored, to the Arctic squadron under Sir E. Belcher. By this plan the noble efforts of Lady Franklin (who has contributed much more largely than all the subscribers united to the outfit of the ‘Isabel’) would be recognised, and the wishes, I venture to say, of all promoters of the expedition satisfied; for every one must know, that the shortcoming of provisions has before now been the main cause of Arctic researches being prematurely checked. Again, it may be noted that, if so employed, the ‘Isabel’ could, after leaving her supplies at Beechey Island, return to England this autumn with accounts of our absent explorers, and be ready for a spring voyage, if required, to Behring Strait or elsewhere.

The extraordinary excitement which has been produced by the appearance of two half-wrecked ships which were said to be seen floating southwards upon an ice floe in north latitude, along the shores of Newfoundland, by persons on board the ship ‘Renovation,’ on the 21st of April, 1851, is a manifest proof of the deep interest which is still taken in the fate of Franklin and his crews. Some navigators considered that this appearance may have been a delusion, which might easily have operated on the mind’s eye of persons who for the first time saw a floating mass of ice. But I agree with naval friends who have looked into this case, that the evidence is too clear and circumstantial to allow us to doubt that the objects were vessels. We must also bear in mind that the tract to the south of St. John’s is precisely that in which we know, from the excellent ice-chart of Mr. Redfield, such floating ice

prevails, and occasionally in great quantities.\* This author has demonstrated that very large masses of floating ice, sometimes miles long, not only abound where the 'Renovation' was sailing, but extend to the south of the 40th degree of N. latitude; occurring even in the Gulf-stream, and chiefly between 45° and 55° W. longitude. As to the position of these ships, we know, from the sketches of our Vice-President Sir G. Back, how a ship forced by the irresistible pressure of the ice high on the pack, and wedged there for four months, may be, as his ship the 'Terror' was, on her beam ends one day, heaved out of water another, and upright, though a wreck, upon a third. Nor does it appear that any good reason can be given, why a large field or floe, in which ships had been frozen up, should not have so broken up, after some years perhaps of congelation, on a great scale, that it might transport the vessels to vast distances, partly imbedded in, or firmly attached to, its rough and hummocky surface; as the keel of the 'Terror' was on the occasion alluded to. Any one who has seen the condition of the surface of ice on the Russian lakes, or at the mouth of a great northern river, in the spring, can easily realize the idea that ships might just as easily be transported to considerable distances as the huge blocks of stone which such floes have been known to carry. It is the last-mentioned fact which has enabled the geologist to explain how, in former periods and when our lands were submerged, colossal blocks were wafted to vast distances from their parent rocks, and dropped to the bottom of a former sea when their ice-rafts melted.

Granting that two ships were seen floating on ice, it is possible, say some persons, that they were the 'Erebus' and 'Terror,' which had been abandoned long ago in a far northern sea (the Polynia of the Arctic circle), and, if so, that their crews may have taken refuge on the nearest adjacent lands. In obedience to the drift, the floating ice may (they add), for aught that any one can gainsay, have made a coasting voyage unknown to man, by trending along a northern but undiscovered shore of Greenland and then descending to Newfoundland in the great current which sets in between Greenland and Iceland. Or, taking a much more limited view, others suggest that the ice-floe with its ships may simply have been dislodged from one of the numerous deep bays or inlets of Baffin's Bay. Not pretending to form a definite opinion on either of these hypotheses, I will only say that the barest possibility of these ships having been the 'Erebus

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\* 'On the Drift Ice and Currents of the North Atlantic, with a chart showing the position of the ice at various times.'—*American Journal of Science*, vol. xlvii. p. 373.

and 'Terror' (and some naval men believe it to be possible) is a strong reason for renewed exertion to discover our absent friends or their relics in the lands to which they may have repaired.\* Even if it be supposed that the ships were ordinary whalers, still the fate of their crews ought if possible to be ascertained.

In the idea that any of our countrymen (if only the most active portion of them) may have been eking out an existence in polar lands, cut off from all intercourse with civilized men, we have indeed redoubled cause to make fresh efforts to exhaust the survey, and to leave no chance untried. For, when such good Arctic naturalists as Richardson and Scoresby, such an able seaman as Kellett, and such a practical explorer of snow-clad lands as Rae, coincide in the belief, that animal food sufficient to sustain life may have been found, why are we not to indulge in the hope, that some of our long-absent friends may yet be alive, and even in a latitude as far north as that of Spitzbergen, in which the Russian sailors of the last century lived, and whence three out of four were brought home in perfect health after an exile of more than six years?

On this subject, however, it is my duty to look also at the other side of the prospect, and state that some Arctic authorities entertain a different opinion. From Captain Ommanney, for example, to whom we are indebted for the delineation of a new coast-line to the south of Cape Walker, and an instructive descriptive memoir,† we learn that the lands which he traversed are very sterile, and afford little animal sustenance. On the other hand, it is clear, from the testimony of many explorers, that animals do abound in much higher latitudes than those explored by that officer; and it is well to reflect that this unequal distribution of the means of supporting life is coincident with the direction of the isothermal lines, as exhibited on the little map of Mr. Petermann. The last-mentioned gentleman and Mr. P. L. Simmonds have collected and brought before you valuable testimony to sustain the hope, that human beings may live for many years on the natural resources of parts of the Arctic regions. But here again we must fence round this bright prospect with all the conditions of the problem, and not be over sanguine. For, whilst we have a right to hope that our absent friends may, like the Russian sailors, have found another Spitz-

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\* It has been recently stated that the ships seen from the 'Renovation' were not housed in, as at first reported, and were not therefore in all probability Franklin's ships; but it must be recollected that the same party which took away the sails would also carry the "housing" ashore for purposes of shelter.

† Captain Ommanney's memoir has not yet, I regret to say, been sent in for publication.

bergen, it must also be admitted, that they may have been compelled to take refuge on coasts where few animals, save seals, could be procured, whence the birds so numerous in summer would migrate during the long season of darkness and cold ; and that under such untoward conditions, their energies possibly paralysed by disease, we could scarcely suppose that even the most hardy of the brave men could have struggled on for any length of time.

Most geographers, however, I am happy to say, cling rather, like Admiral Beaufort, Capt. W. A. Baillie Hamilton, Mr. J. Barrow, and myself, to the hopeful than to the desponding side of this picture of Arctic chances. I rejoice, indeed, in presiding over a Society that does not now abandon hope any more than when the bold veteran Sir John Ross, and his nephew Sir James, who was destined so ably to explore the Antarctic seas, had been absent four years, and were quite given up by high authorities. It was then that the Royal Geographical Society flew to the rescue, and stimulated the public to effect by subscription what the British Government declined to execute as a hopeless task.

A like feeling has supported Lady Franklin through the memorable exertions she has made, to equip and transmit the 'Prince Albert,' under Captains Forsyth and Kennedy, at her own expense ; to contribute much to the outfit of the 'Felix,' under Sir John Ross ; and to provide largely for the equipment and purchase of the 'Isabel.' To this feeling also we owe one of the finest examples of disinterested philanthropy which history has recorded, in the conduct of Mr. Grinnell, the President of the Geographical Society of New York, who sent forth, at his own cost, an expedition of two vessels, under the command of Captain de Haven,\* and which has led us to confer on that noble-minded citizen of the United States the distinction of being one of our Honorary Members.

In reviewing all that Britain has accomplished in polar researches, whether in the spirit of discovery or of philanthropy, we must not, however, forget how boldly our former rivals, the Dutch, navigated in those seas. It is even asserted that their old explorers reached to within one degree of the pole. However this may have been, we know that Barentz † advanced considerably to the north, in the great sea between Spitzbergen and Nova Zembla.

It is indeed singular that this, by far the widest—indeed the only oceanic opening towards the North Pole—should in this century have

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\* See the clear and unpretending official report of this good officer describing his co-operation with our expeditions.

† The Hakluyt Society will soon publish the voyages of Barentz, the English translation of which, in 1609, is very scarce.

been so much neglected, and that nearly all our recent efforts should have been accumulated upon the north shores of America, where every succeeding year has brought with it discoveries not of open sea, but of numerous masses of land separated from each other by comparatively narrow channels of water. Our associate Mr. Petermann has recalled public attention in a clear and emphatic manner to the great open highway leading to the North Pole. This laborious young German physical geographer, who is now naturalized amongst us, has shown that, whether we look to the ascertained outlines of the land, the range of the isothermal lines, the results of the annual summer debacles, issuing from the mouths of the gigantic rivers of Siberia, or to the great predominance of water, and with it a milder climate, it is to be inferred that, if a steam-vessel were to be steered during the winter or spring months directly N.E. from the British Isles, she might pass into the Polar seas in a fortnight or little more without encountering any serious obstacle, and thus be soon in a position which our own ships have been struggling to reach through defiles of land-locked water encumbered by ice.

This ingenious hypothesis seems to rest on some good preliminary data; for at Bear Island, beyond North Cape (the Cherrie Island of early English navigators), my friend, the praiseworthy Norwegian geologist, Keilhau,\* the author of the '*Gæa Norvegica*,' who visited it in 1827, obtained from some seamen in Hammerfest, who passed the winter of 1823-4 upon it, certain curious meteorological data, showing the mildness of the climate in that high latitude ( $74^{\circ} 30'$ ), where they encountered no severe cold, and saw neither packed nor floating ice in the sea. Again, in August, 1827, that very successful Arctic explorer Sir Edward Parry, proceeded, in spite of a powerful counter-current, to the most northerly point ( $N. 82^{\circ} 40' 23''$ ) ever reached in our day, and found no bottom to the sea at 500 fathoms depth, no land visible, and little ice with much rain.

This modification of climate in so northern a latitude is doubtless due to the same cause, the proximity of a great sea, as in the well-known example of the long and narrow Siberian promontory of Taimyr, explored by our former medallist Middendorff, and to which I formerly invited your attention.† In other words, it is caused by the pre-

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\* My eminent geological friend, Leopold von Buch, first made known to the German public, in 1846, the importance of M. Keilhau's observations in Bear Island, and deduced therefrom some important generalizations ('*Trans. Berlin Acad. of Sciences*'). A translation of his memoir, by Professor J. Nicol, is given in the '*Journal of the Geological Society of London*,' vol. iii., *Translations and Notices*, p. 48.

† See *Journ. R. Geogr. Society*, vol. xv., *President's Address*, p. cii.

dominance of water over land; the former tempering cold, the latter when in great masses producing it. It is then by the application of this distribution of heat and cold, which resulted in the establishment of the isothermal lines of the great philosophic geographer Humboldt, as well as by attention to the fact of the vast icy masses of the North Siberian shores being held together to the land during the winter, that Mr. Petermann\* has made the novel suggestion, that a winter, or rather an early spring, search should be attempted through a belt of water which is too broad to be affected by congelation; and that this effort should be carried out at a time when this sea is not rendered impassable (as it is in summer) by floating fields of ice proceeding from the Siberian shores. As an instructive map to explain this author's views has been prepared, and the project is under the consideration of the authorities, it is just possible, that before our next anniversary we may hear of a steam voyage towards the North Pole and back, which may have penetrated beyond Parry's farthest north, and which shall have been executed in the ensuing winter and spring! Why might not the strong little screw-vessel, the 'Isabel,' and a consort, if placed under a vigorous commander, effect such an object? or why, some sanguine persons would say, might not such an expedition even get through the Great Polar Sea, and emerge from it by Behring Strait? For, whilst much caution is required in forming an opinion on this subject, and whilst I refer you to the former partial efforts of Buchan and Franklin, as described by Beechey in 1818, and also to the fact that whalers do not resort much to that great opening, it must be recollected that the proposal of Mr. Petermann is original and untried; all our previous expeditions having been made in the summer.†

In quitting the consideration of these exciting topics, which have much occupied your attention during a large portion of the session, let me remind you that, if we are now well assured that no practicable north-west passage, as suggested by Cook and contended for by Barrow, can be detected, it is still a satisfactory reflection, that in the pursuit of an object which the last discoveries have *almost* set at rest, our countrymen have maintained pre-eminence in nautical researches, and that, in spite of great natural obstacles, they have de-

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\* Since the Address was read, Mr. Petermann has embodied his views on various Arctic topics in one pamphlet, entitled, 'The Search for Franklin,' with the polar chart above alluded to, &c.

† Sir G. Back, who was in the expedition of Buchan and Franklin, to the north of Spitzbergen, seems to think, however, that, to say nothing of darkness, the temperature would be too low in winter to admit working with ropes among the ice.

lineated a very great amount of the earth's outline which was entirely unknown to our fathers. In comparing a correct map of the world constructed at the conclusion of the last war with one which exhibits the present state of our knowledge, we at once see the immense debt of gratitude which is due to our countrymen who have won these geographical trophies during the long peace of this century.

#### AUSTRALIA.

*Australian Geography.*—My old friend Sir Thomas Mitchell has presented to the Society a general map of the colony of New South Wales, compiled by himself and engraved at Sydney; and in calling your attention to this valuable document, I have also pleasure in seeing that additions are continually making to the more portable maps of these colonies by Arrowsmith and Wyld.

The south-western portion of this great continent has received much useful map illustration, through the labours of the Surveyor-General of Western Australia Mr. J. Roe, and of Mr. Augustus Gregory.

The general reader has been enlivened by sparkling sketches of the manners and habits of the colonists and natives, as recently published in the 'Antipodes' of Colonel Mundy, who makes the life of an accomplished soldier in Australia or New Zealand familiar to every one.

An instructive statistical work on Australia has been published by Mr. Melville, during many years a resident in different parts of that great country.

Though less read by the public, the work of Mr. Macgillivray, the naturalist of the expedition under our lamented associate the late Captain Owen Stanley, is one of deep interest to the ethnologist, and bids us hope for excellent results on the return of the expedition recently detached to the South Pacific under Captain Denham, and to which our member Mr. Macgillivray is appointed.

This author has shown that, whilst the Australians are nearly in the lowest possible grade of human existence, they have languages more complex than any of modern Europe; these can only have been developed in a long succession of ages. His sketches of the distinctive characters of the different peoples which the expedition visited, whether Malays, Papuans, or Australians, are drawn with simplicity, truthfulness, and power.

*Gold Produce of Australia.*—When I first occupied this chair in 1844, and announced to you a then forthcoming work of my distinguished friend Count Strzelecki, whose collections of rocks, fossils, and whose detailed maps I had examined, I drew your attention to

the remarkable coincidence between the structure of the great eastern chain of Australia, which I termed the “Cordillera” of that continent, and that of the auriferous Ural mountains, from which I had recently returned, remarking that “*as yet* no gold had been discovered in our Australian colonies.” That comparison produced, it appears, however, some fruits; for, in the year 1846, small specimens of gold in quartz rock having been sent from New South Wales, as resulting from what I had written, I at once urged the unemployed Cornish miners, who were about to emigrate, to prefer that colony, and there seek for gold in the débris of the older rocks of that region. This exhortation, which was printed in the Penzance newspapers, October, 1846, and also in the ‘Transactions of the Royal Geological Society of Cornwall,’ caused, I was told, a sensation in Sydney, and set other individuals to search after the precious metal; and in 1848 I received letters, dated 1847, from persons in Sydney and Adelaide quite unknown to me, who stated that they had detected gold, and that they knew where they could find much more, provided the Government would modify the mining laws, and render it worth the while of speculators really to open out mines.

Indeed, Colonel Helmersen, my associate in the Academy of St. Petersburg, writing to me in 1846, and unaware of what I had previously printed in 1844, also compared the Australian rocks with those of the Ural. He further urged me to draw the attention of the Government of New South Wales to the probability of finding gold in the alluvia of that country; but although I then expressed my opinion very decisively in Cornwall and elsewhere, I did not feel myself entitled to address the Government until 1848, when I explained my views to Earl Grey,\* then Minister of the Colonies, informing him of fresh confirmations of them from Victoria Land as well as Sydney, and referring him back to the comparison of 1844, and to the anticipation of quantities of gold-ore in 1846—both of which publications, I need not remind you, were anterior to the discovery of the Californian gold (1847). Such printed documents, followed by an official letter of November, 1848, which is registered in the Colonial Office, prove, I apprehend, that your President was the person who, by inductive reasoning, and a comparison of the rocks of two very distant countries, anticipated the production of the Australian gold; and I here record the

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\* Earl Grey did not take any steps in this matter, because, as his Lordship has since informed me, he feared that the discovery of gold would be very embarrassing to a wool-growing colony. Colonel Helmersen has not printed anything on the Australian gold; but I introduced his name into my Cornish letter to Sir C. Lemon, and hence it became known in the Australian colonies.

fact, because the view would never have been promulgated had you not, gentlemen, honoured me with this chair, and thus incited me to do my duty, and show the usefulness of our science, by comparing two distant meridian chains of the earth, one of which belonged to our own country.

I must here, however, do justice to my friend and associate in the Geological Society, the Rev. W. B. Clarke, who, for a long time resident in the colony of New South Wales, played a prominent part in the discovery of the gold some years before profitable works were opened by Mr. Hargraves in 1851. Mr. Clarke states, that as early as 1841 he expressed his opinion to persons there, to whom he refers, that the colony would prove to be a 'gold country.' Believing in the accuracy of his declaration, I must be permitted to say, that as no one in England was made acquainted with his views, and as the first *printed* document which bears his name is dated in 1847, he will doubtless admit that the published comparative and inductive reasonings of 1844-6, by which the anticipation was arrived at *here*, were wholly irrespective of his local and unpublished conversations. In truth, no geologist who returned from Australia before the year 1847 had ever adverted to the occurrence of gold ore in these colonies.

For my own part, however, I would in no way derogate from the independent merit of Mr. Clarke, and I trust that in the colony on whose geological structure he has thrown much light, and in which he is now exploring the extension of the gold ore, he may long enjoy the credit to which he is justly entitled, for having there roused attention to the phenomenon.

The extent to which gold has been worked in our Australian colonies is to be seen generally in a compendious map, inserted in a small work on the general distribution of gold over the world, by our associate, Mr. Wyld, chiefly taken from the instructive work of M. Adolf Erman; and when new and more detailed maps are produced, which are in preparation by Mr. Arrowsmith, it will be seen how this golden flood is distributed at intervals, and, just as I expected, on the flanks of the main watershed, or backbone, of that continent, which, trending from north to south, bends off the west to pass to the north of Melbourne, where one of the richest accumulations has recently been detected at Mount Alexander.

It is unnecessary here to recapitulate data on which I have been dwelling for some years past: the chief inference from such facts was, that as auriferous veinstones and masses usually deteriorate downwards in the parent rock, and that their richest parts have been superficial, the most prolific goldfields are necessarily composed of that *débris* or

drift which has been abstracted by *former great operations of nature from the surfaces of the mountains, and distributed in heaps of gravel, mud and sand, upon their sides or in the adjacent valleys.*

I have also endeavoured to show, that as gold has never been found in a notable quantity, except along the slopes of the more ancient backbones or axes of continents, and has never been derived in any quantity from secondary or tertiary strata, so the goldfields of nature are restricted to such comparatively narrow zones. When, however, we look to the vast length of the “Cordillera” of Australia, and of other ridges which may be found to be similarly constituted in that continent; and, above all, when we reflect, that no other large region of the earth has been so unoccupied by human beings acquainted with the value of the metal, it behoves us to be prepared for a considerable (though temporary) augmentation of it.

Eight years have elapsed since I spoke to you, in a former address, of the social and political effects which might be produced by new large supplies of gold, such as of Siberia, and to which I called the notice of British statesmen. But although, in the intervening years, California and Australia have let loose floods of gold, the very apprehension of which would formerly have alarmed most statists, we have yet to learn that any sensible diminution of the value of our standard metal has taken place.

Whilst as a geologist I have affirmed, from reference to experience and physical data, that, large as the supply may now be from the opening out of two great auriferous tracts previously unknown (because the regions were untrodden by civilized beings), such supplies as come from California and Australia will prove exhaustible because *superficial*, just as was the case in those parts of the old world, which in their day had rich auriferous deposits. I may, indeed, now announce to you that, as far as can be ascertained, the supplies are already diminishing from two of the great sources—Siberia having given considerably less than in previous years, whilst California, the produce of which had been run up to a very large amount through the indomitable energy of the Anglo-Saxon race, is likely to fall short (if I am not misinformed) this year by some millions sterling.

Though incompetent to speak of the political, social, and statistical effects of the remarkable golden shower of this century, I may put you in possession of words which proceeded from a master-mind, now no more. In a letter addressed to myself in March, 1850, the late Sir Robert Peel, after alluding to an evening discourse I had delivered at the Royal Institution, thus proceeded:—“On the 6th of

May, 1844, in bringing in the Bank Charter, I adverted to the rapid increase of the annual supply of gold from mines within the dominions of the Emperor of Russia, and recommended those who wished for a relaxation of the standard of value in order to benefit the debtor, well to consider whether their objects might not be effected by natural causes—the decreasing relative value of gold in consequence of more abundant supply, without the aid of legislative intervention. Your arguments,” he added, “are powerful to show that there is no probability (risk I should say) of precipitate and violent disturbance. *It takes a long time, and a great disproportion in the amount of supply, to affect the relative value, throughout the world, of two such articles as gold and silver.* The united influence of Siberia and California will, however, I think, justify my inference of 1844, that there is a tendency towards diminished value on the part of gold. An extraordinary increase in the supply of both gold and silver might concurrently take place, not affecting their relative value between each other, but affecting the price of all other commodities estimated with reference to the precious metals, and the interests of debtor and creditor.”

The truth of the sentiment which is italicized has been fully borne out by the events which have followed since the great statesman was taken from us. Those events have also concurred in showing the improbability of any precipitate or violent disturbance being produced by the new discoveries.

#### BRITISH WORKS.

Intending to treat of what has been called “our own labours,” by alluding to the memoirs read before us in conjunction with general observations on the quarter of the globe to which they pertain, let me first say a few words on works, either looked for or completed, which specially concern my countrymen.

*Tides.*—Physical geographers have drawn various curve lines on the surface of the globe, representing the distribution of temperature, of seas and winds, of nations and languages, vegetation, animal life, &c. &c.; which lines have been recognized as presenting, in a compendious and striking form, the result of great masses of the labour of travellers and observers. Lines thus exhibiting the result of many observations belong to the aqueous as well as to the dry portions of the globe. The cotidal lines, for instance, which mark the form of the large waves proceeding from the great oceanic current, which constitutes the tide that is twice a day carried to every shore, are a

subject of inquiry which may well interest the geographer no less than the astronomer. The form of these cotidal lines has been the object of various researches, from Dr. Whewell's 'Essay towards a First Approximation,' in 1833, to Admiral Lütke's 'Notice sur les Marées Périodiques dans le Grand Océan Boréal et dans la Mer Glaciale,' in 1839. But notwithstanding these admirable efforts, together with the Memoirs of Sir J. Lubbock, and the practical observations of Mr. Bunt, &c.,\* our data on this matter are very incomplete, and the cotidal lines in the great ocean spaces very doubtful in their form, as the author of the 'First Approximation' himself proclaimed.

The British Association for the Advancement of Science has, therefore, most appropriately urged upon the Government the importance, for scientific ends, of an expedition of a surveying ship being sent out "ad hoc" to pursue the construction of a map of the tides and oceanic currents as its sole object. Such an expedition could not fail, in a year or two, to supply in a great measure what is thus wanting to hydrography; being, among other recommendations, a scientific exploration of a new and yet obvious kind, in which it is to be hoped England will take the lead; for the expense will be very trifling in comparison with the scientific honour and value, if not the uses, which we shall derive from it.

*New Works.*—Mr. Alexander Keith Johnston, who has already done much to introduce the study of physical geography into this country, has recently published two Atlases of General and Physical Geography for the use of schools, which are novel among us as to their execution; being printed in colours after the method employed on the continent for geological coloured maps, and rendered more simple by improvements introduced into that process. The Atlas of General Geography is preceded by a most useful table of every place to be found on the maps, with an easy indication for finding them, and with their latitudes and longitudes to the nearest minute—a degree of accuracy sufficient for every purpose of geography and history. The School Atlas of Physical Geography is a reduction of his larger works with the more recent discoveries, and must form a valuable accompaniment to the treatise on Physical Geography by our talented countrywoman Mrs. Somerville. These works are to be followed by Atlases of Classical and Scripture Geography on the same plan, the whole forming a most valuable addition to the imperfect means hitherto possessed by the teacher for imparting to our younger fellow-countrymen a good know-

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\* Phil. Trans. 1833, p. 147, also 1835 to 1838; and Rep. Brit. Ass., 1838-9-41.

ledge of geography, the study of which has been hitherto too much neglected in our public schools.

Mr. Petermann has presented to us a series of elementary physical maps, now sixteen in number, the first of which, on the chief botanic regions of the world, was announced last year, the latest being on 'Ocean Currents and River Systems.' The same indefatigable author constructed and published, you will recollect, the geographical view of the origin of the articles in the Great Exhibition of 1851, and has also prepared (in conjunction with another of our members, the Rev. S. Clark) maps illustrative of the Ecclesiastical Geography of the British Empire, from the fourth century to the present time.

Mr. Findlay has completed his 'Directory of the Great South Sea,' a work likely to prove very important to navigators. It is divided into two large sized volumes, in which authorities from all countries have been collected, and the introduction contains a condensed historical notice of all the principal Pacific navigators. This useful work is accompanied by a chart, consisting of twelve sheets of double elephant paper, including the whole ocean from the shores of America to those of Africa, and forms a complete view of the Indian and Pacific Oceans.

The Society has received as a donation coloured plans on a scale of 24 inches to the mile of town surveys, which have been prepared as specimens by the Board of Health. They are good examples of the minute accuracy with which her Majesty's military surveyors can execute their work, whilst the clear and methodical arrangement applied to it by Mr. Chadwick and his assistants gives us every reason to believe that the nation may expect the most salutary results from their labours. The accompanying minutes of information respecting the drainage of towns, roads, and suburban lands are highly instructive.

The Gazetteers now in progress of publication, respectively entitled Knight's 'Imperial Cyclopædia,' Blackie's 'Imperial Gazetteer,' and Fullarton's 'Gazetteer of the World,' are, each of them, cheering examples of the increasing demand for geographical instruction, and far exceed, in copious description and pictorial illustrations, any works of this class previously published in our country.

If my predecessor spoke in terms of commendation last year of the efforts of our associate Mr. Wyld to popularize geography by the construction of his great model of the earth, I am bound to record the expression of my belief, that this effort has been very successful, both by instructing the lower and middle classes, and by inducing many of the higher classes to attach to our science the importance it deserves.

Having heard from many who went to Leicester-square to scoff, that they came away with increase of knowledge and a desire to renew their visit, I doubt not that this model of the earth has been one of the best popular auxiliaries we could have been provided with, for the increase of the numbers of this Society.

Dr. Smith, who has rendered great service to classical studies, has followed up the publication of his Classical Dictionaries by one of Ancient Geography; the two first numbers of which, embracing the letter A, have just appeared.

A very useful 'Manual of Geography,' the joint production of Professors O'Brien and Ansted, Col. Jackson, and the Rev. C. G. Nicolay, has also been presented to the Library by the publisher, Mr. Parker.

*Meteorology.*—It is pleasing to learn that a Meteorological Society has been formed last summer at the Mauritius under the auspices of the Government, which, from the names of its councillors, and the very good regulations which it has issued, promises to obtain much novel information from that colony and the surrounding ocean.

Many are the facts which still remain to be recorded before the laws of atmospheric phenomena can be established; but the success which attended the labours of Sir W. Reid, in proving the gyration of great storms, is an encouragement to geographers to call for fresh data.

Professor Oldham, in writing to me from Churra Poonjee, in the Khassya Hills, north of Calcutta, states that the rainfall is there about 600 inches, or  $8\frac{1}{2}$  fathoms, per annum; 550 inches of which descend in the six rainy months commencing in May; and that in one day he measured a fall of 25·5 inches! This remarkable phenomenon was, it appears, previously well known to Drs. Hooker, Thomson, and other scientific men; but as the facts were only recorded in local periodicals, it is well to give them as great a publicity in England as they have obtained in Bengal.

Our Society has received from Mr. Hugh Thurnburn, through an Associate, Captain the Hon. Henry Murray, R.N., the communication of a meteorological journal kept by him at Alexandria during three years (1847-8-9). The instruments used and their positions are described, and the observations apparently made and noted with great care. This journal contains data from which a very complete account of the climate of the locality might be derived; data which to this time were so deficient, that even in respect of temperature, in the well-known and elaborate tables of Professor Dove, the mean monthly temperature of Alexandria was obtained only from eight

months' observations. The annual amount of rain at Alexandria stands in contrast to that, which I have just mentioned as occurring in places in India, the quantity at the former being only  $7\frac{1}{2}$  inches. This quantity, indeed, might be expected to be small, from our knowledge of the fact that three or four degrees to the south the country is nearly rainless.

In a paper lately read before this Society, by Captain William Allen of the Royal Navy, giving an account of observations taken by him with the aneroid in Syria and Palestine, the author expresses an opinion rather more favourable to this little instrument than has been generally entertained, acknowledging however, at the same time, that it is liable to errors; among which he enumerates "the want of a standard-point, alteration in the elasticity of the spring, the expansion or contraction of the lever," &c.

Let me add the expression of my wish (and an example will shortly be given from Zanzibar by Colonel Sykes) that by means of well-conducted meteorological observations, made in those parts of Africa where Europeans are resident, aided by such casual information as is obtained by the explorations of travellers into its interior and unknown districts, we shall be enabled, at no very distant time, to account for the exceptional and apparently anomalous physical conditions of this vast continent.

*Ordnance Survey of Scotland.*—In referring you to the Report of a Committee of the House of Commons, appointed last Session to inquire into the state of the Ordnance Survey of Scotland,\* I am happy to state that the more active measures for the construction of a general map of that country, which I have been urging for eighteen years, have at length been adopted. The publication of maps on a six-inch scale, which had been carried out for the whole of Ireland at a great expense, had been already applied to two southern counties of Scotland, with the addition of "contour" lines, when it was ascertained that with such a process, and at the then rate of outlay, *more than half a century would elapse* before North Britain could have any map!

The British Association, at my instigation, first roused attention to this subject in 1834, and so effectually revived it in 1850, that the above-mentioned Committee of the House of Commons was at length appointed. Their Report has happily procured a grant of 25,000*l.* per annum for the Scottish Survey, accompanied by a strong and distinct recommendation that this sum *should be exclusively devoted to the com-*

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\* See also Mr. Keith Johnston's instructive 'Historical Notice of the Progress of the Ordnance Survey in Scotland,' and an excellent article on the whole subject in the 'Edinburgh Review' for January, 1852, p. 179.

*pletion of a real map, on the scale of one inch to the mile.* If this suggestion were complied with, and the *publication* of the six-inch survey suspended until the general map was finished, though the country be really surveyed on that scale, all Scotland would be usefully mapped in ten years. In the Report of the Committee of the House of Commons—for which we are specially indebted to its intelligent chairman, the Hon. Francis Charteris—you will see how the opinions of the eminent civil engineers, Stephenson, Brunel, and Locke, agree with those of the members of the Committee, in the earnest recommendation of the speedy publication of a map upon a one-inch scale for general purposes.

In fact, the Committee could not avoid being strongly impressed with the declaration of a previous Parliamentary Committee appointed to inquire into the state of geography in Ireland, who reported that, after an expenditure of 850,000*l.*, and the publication of a complete six-inch survey, the sister country was still without *a map*. The six-inch survey is, in truth, much too cumbrous for consultation in county matters; and though there are certain tracts of mining-ground where it is unquestionably of value, it is too small for many detailed purposes of the engineer and farmer, for most of which a double or even a treble scale is required.

Rejoicing, as I did, in the decision of the House of Commons in reference to Scotland, and also in learning that a sufficient sum had been granted to complete the map of all Scotland on the scale of one inch, in the space of ten years, I have recently been grieved to hear that local petitions from the south of Scotland have been got up to procure a *publication* of the six-inch survey. I have been told that some of the persons so petitioning are acting under the belief that each proprietor will thus obtain a plan of his estate. But even if it were so (the scale, however, is much too small for plans of property,) what sort of patriotism is it, I ask, which, for such considerations, should sacrifice the interests of Scotland at large, and possibly postpone for a long period the issue of any real map of the whole country? Let the Highlanders and their chiefs unite as one man against this injustice to their region, which of all others in North Britain will most signally develop the beauties of topography on a good and useful general scale!

*Guano.*—On few subjects have the commercial and agricultural public been more incited to study distant and almost unknown specks on the face of the globe, than in the search after the deposit of birds, so useful as a manure. The Peruvians, possessing the Chincha Islands, where it

abounds, held almost a monopoly of this article, until our speculators, reading of the Isle of Ichaboe, off the south coast of Africa, brought from it supplies which for a time lowered the price one-half. But Ichaboe being almost exhausted, and the monopoly prices having been resumed, spurious imitations of the real substance have been largely palmed upon the public. It is therefore important to know that the Islands of Lobos de Afuera (lat.  $6^{\circ} 56' 45''$  S., long.  $80^{\circ} 43' 55''$  W.) and Lobos de Tierra (lat.  $6^{\circ} 26' 45''$  S., long.  $80^{\circ} 52' 50''$  W.), off the coast of Peru, contain at this day as much guano as when they were described by the American navigator Morrell. Politics do not enter into our domain, and we must refer to statesmen the question agitated by Captain Wentworth Buller on the one hand and by Mr. Peacock on the other, as to the ownership of these islands. But, whether Peru possesses really the rights of sovereignty or not, let us hope that effectual measures may be forthwith adopted for facilitating the exportation of this valuable substance to the shores of other countries.

#### LABOURS ON THE CONTINENT OF EUROPE.

*Russia.*—The Imperial Geographical Society of St. Petersburg, which was founded in the year 1845, on a plan similar to our own, as I formerly announced to you, has, under the liberal endowment of the Emperor, and under the Presidency of our Honorary Member the Grand Duke Constantine, undertaken the execution of a range of duties and publications much beyond that to which we can pretend, unassisted as we are by our Government. One of the great objects in the formation of this Imperial body being to diffuse statistical as well as geographical knowledge through a vast empire, the mass of whose inhabitants are unacquainted with any foreign tongue, it became essential that the Transactions should be printed in the Russian language. Hence it is, that even now, when we have obtained its publications, they are sealed books to the great majority of readers, and call therefore for that brief explanation which I have been enabled to obtain of them. Seeing before me the important list of works which is about to be enumerated, I cannot forbear to express a hope, that a translation of the most original of the Russian discoveries should be simultaneously published by a Society which contains many highly educated men, fully competent to execute the gratifying task of diffusing an acquaintance with the geography of their country through Western Europe and the rest of the world. Besides defraying the cost of expeditions, the Russian Society publishes five classes of memoirs:—1. Its own Transactions (*Zapiski Ruskago Geograficheskago*

*Obchestva*); 2. Geographical News (*Geograficheskie Izveztiia*); 3. Compendium of Russian Statistics (*Sbornik Statisticheskikh Svedeniy Rossii*); 4. Pocketbook for the Friends of Geography (*Karmanaya Knizhka dlia liubiteley Geografii*); 5. Almanac of the Society (*Vestnik Imperatorskago Ruskago Geograficheskago Obchestva*). To these there has very recently been added an octavo volume of a 'Bulletin.' The first and second volumes of the Transactions, in addition to an opening Series by the great astronomer Struve, contain memoirs on descriptive geography; such as On the Mangishlak Peninsula, by Colonel Ivanin, with a Map; On the North-west Coast of America, by Lieutenant Zagoskin; On the best Means of Reaching the North Pole, by Admiral Wrangel; On the present State of Geodetical and Topographical Research, by General Bolotoff; and On the Possessions of the Hudson's Bay Company, by the Academician Savich;—Ethnographical Treatises by our foreign member Bäer, and also by Khanikof, Nadegin, Bodey, and Chegren, relating to Russia, including Livonia and Courland, the interior Kirghis, the Turkoman tribes (Yamud and Goklan), &c.;—Historical and Statistical Account of the Russian Coinage, by Arsenief; On Russian Statistics, by Zablotsky; and On Climatology, by Poroshin.

The third volume contains, amongst other subjects, the Exploration of the Upper Valleys of the Amu and Sir Daria (Oxus and Jaxartes), including the table-land of Pamir, with a Map, by my able and lively friend M. Plato Tchihatchef; 'The Merits of Peter the Great in diffusing and promoting Geographical Knowledge in Russia,' by the Academician Bäer, which, followed by a second part in the next volume, is, I am assured, an excellent memoir, and I hope it may be translated into English. There is also an Outline Sketch, with the best existing Map, of the Kokan Khannat (Northern Tibet and Bolar), by the Topographical Staff, under the auspices of Prince Gorchakof, the Governor-General of Western Siberia.

The fourth volume contains Surveys of the Caspian, by Colonel Blarremberg; and a Memoir on the Commercial Routes of China, by Paladiy Kafarof, the learned Bishop of the Russian Mission at Pekin.

In the fifth volume we have the account of the last Geographical Explorations of the North Ural, by Hofmann, Strajevsky, and Kovalsky; a rough Survey of the Coasts of the Aral, by Captain Makshef; an Outline of the Khannat of Khiva, by Colonel Danilevsky; Sketches of the Wild Rock of the Khirghis, by Prince Gorchakof; an Illustration of the Map of the Aral Sea, by Khanikof; and a Review of the Trigonometrical Labours in Russia, by Captain Maksimof.

In this bare enumeration of the chief memoirs in the Transactions of our contemporaries you will recognise the efforts of astronomers, ethnographers, statistes, and botanists, to unite with pure geographers in accumulating data, which illustrate distant portions of their vast empire, or of its neighbouring states. The publication entitled 'Geographical News' is a praiseworthy endeavour of its compilers, Professors Nadejin and Gregorief, to diffuse an acquaintance with the geographical science of Europe and the rest of the world among the upper and middle classes of Russians. The Compendium of Russian Statistics, of which a first volume only appeared in 1851, promises to be very valuable, if continued with care and perseverance. It embodies Memoirs of Professors Vesselofsky, Käppen, Zablotsky, and M. Milutin, and one by the Vice-President of the Society, M. Michel Muravief, the chief of the Civil Engineering Department, to whom we are indebted for several communications relating to our own projects of explorations towards the North Pole, and in Arabia. Our sister society of British Statists will no doubt cull from this volume some important data as to the state and progress of population of a large region hitherto so ill known in Europe; whilst many persons will be deeply interested in an admirable review of the productions of the mines of Russia, by my eminent friend Lieutenant-General Tcheffkine (to whose assistance I was so signally indebted during my Survey of Russia), and by Colonel Ozersky, an able officer of mines, who has translated the work of my colleagues De Verneuill, Keyserling, and myself, into the Russian language.

The 'Geographical Keepsake,' like the 'News,' is intended to instruct and to arouse a curiosity for research; and though one volume only has appeared, it comprises, besides miscellanies, able Memoirs of Professor Kanitz, of Dörpat, On the Progress of Geographical Knowledge from the beginning of the Eighteenth Century; of the Academician Lentz, On Heat in reference to Climatology; of Bäer, On the Influence of External Nature on the Social Relations of different Nations, and on the History of Mankind; and of Savelief, the Orientalist, On Central Asia.

The Geographical Almanac, which is little more than an appendix to the regular Transactions, and might have been included in it, contains, however, two interesting Memoirs,—the one by M. Streznevsky, On the Geographical Materials of the Russian Language; the other by M. Khanikof, one of the Secretaries of the Society, On an Excursion to Tachkand, in Central Asia, by MM. Pospelof and Burnachef, in 1800.

The *Compte Rendu* of the works of the Imperial Society in 1850, being in the French language, will have made you acquainted with some of the results of the labours of our contemporaries, particularly through the medium of its accompanying instructive general Map, on which many new data are indicated.

Besides these productions of the Russian Geographical Society, we have received pamphlets, one of which, of considerable value to the practical geographer, is the Register, by Khanikof and Tolstoi, of various positions in North-western Asia, astronomically determined. Again, to condense and register the materials accumulated in the preceding years respecting the countries lying between the Bolor, the Caucasus, the Hindoo Kush, the Atlas, and the Ural, General Bolotof and M. de Khanikof undertook laborious comparative estimates, which, with many lists of astronomical determinations, they have published in separate pamphlets. M. de Khanikof writes to me, in terms of great regret, that he has not yet had time to bring out the interesting journal of the Italian Envoy, Florio Beneveni, on a voyage which he made in 1721-25 from Astrachan, by Mesched, to Bouhkara and Chiva. In the mean time he has published useful analytical criticisms on Maps of the Khannat of Chiva and the Aral Sea, and accounts of journeys in those regions of Asia and its Steppes, of which we have previously had the best general descriptions from our foreign member Colonel Helmersen.

Whilst speaking of that region it must be noted, that Capt. Bootakof, an accomplished officer of the Imperial navy, laboured hard and successfully during two consecutive years, and under great difficulties—first in the construction of two small vessels, next in the difficult exploration of the inhospitable Sea of Aral—in determining by astronomical observations the true outlines of its coasts, and in sounding its depths. Though the knowledge thus acquired has not yet been published, let us hope that the same munificent conduct which has led the Imperial Government to diffuse among other nations a perfect acquaintance with the features of the coasts of the Empire, will operate, and thus make known all the physical phenomena pertaining to this inland mass of water, which, forming part of the grand Aralo-Caspian depression in the earth's surface, is singularly interesting to geographers and geologists.\*

Having offered many encouraging examples of the good which may be effected by the Russian Geographical Society, I live in the

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\* See 'Russia in Europe, and the Ural Mountains (Aralo-Caspian),' vol. i. p. 299.

belief that the accomplished Prince who presides over it will, with the knowledge he possesses of what is still wanting in the vastest empire in the world, add lustre to his name by eliciting many further researches of equal interest. Great light, for example, may be still thrown on the interior of Northern and Central Asia by the publication of even those general outlines of the physical features of those regions which the Imperial Government possesses. In the mean time, I rejoice to hear, that the Emperor has authorised an accurate and real survey of the southern portion of the Ural Mountains; and before another anniversary I hope to be in possession of documents which will show you that along her western frontier Russia will have gone far to complete the greatest geographical work in the world, in M. Struve's admeasurement of an arc of the meridian extending over twenty-five degrees of latitude! Such works are worthy of the Russian Emperor who, by energetically condensing many conflicting laws, enabled his subjects to obtain justice, and who by his firmness and moderation has sustained that general peace of Europe, without which science, and, above all, geographical research, cannot flourish.

*Sweden and Norway.*—As few royal personages devote much time and labour to the actual work of the geographer, I have particular pleasure in recalling your attention to the highly-useful hypsographical, mining, and arboreal maps of Sweden, prepared by the hands of our honorary member, the Crown Prince of these kingdoms, which were exhibited to us by Count Rosen, who further explained, that, besides these, his Royal Highness had also constructed a set of maps, showing the judicial, ecclesiastical, and civil organization of the country. When united with a map of the Swedish population, prepared by Colonel Löven, it will thus be seen that all the elements of a great statistical national work are obtained. Our associate and honorary member, General Akrell, director of the Swedish Topographical Corps, has announced a new edition of the military and statistical map of Sweden; and also six new sheets of the chorographical Atlas of the kingdom, intended as a substitute for the work of Hermelin, a proof copy of which has been forwarded to us. The large Topographical Survey extending over 8700 geographical miles, as mentioned in the last Address, is not yet terminated, and a reduction of it only will be published. The Swedish triangulation is united, in the Åland isles of the Bothnian Gulf, with that of Russia, and, passing across the Sound, with that of Denmark, being there connected with the triangulation of the continent of Europe; so that the trigonometrical observations made at Christiania, Stockholm, Pulkova, Berlin, and Altona, are now in harmony.

The trigonometrical surveys and levellings from Torneo to Alten, in the North Sea, are in full operation, and when finished will not only give the relative heights of the Gulf of Bothnia and the North Ocean, but will also serve as fixed data from whence to calculate the greater or less irregularity of the rise or depression of the Scandinavian lands. General Akrell also acquaints us that the excellent Maritime Atlas of Admiral Klint, consisting of 98 general and 35 special Maps, which were all published at the private expense of the late gallant officer, have been purchased by the Government, and are continued by direction of the Swedish Admiralty; and that Professor Than has published his fourth volume of a description of Sweden.

Our honoured associate Hansteen, in writing from Christiania, informs us that the great Survey, to which I have alluded as being conducted under the general direction of the great Russian astronomer Struve, will soon be brought to a termination, as respecting Swedish and Norwegian Lapland, through the labours of Lieutenant Klouman of Norway, Professor Selander, and Dr. Lindhagen of Sweden, in spite of the many obstacles to observation presented by the rigour of the climate, and the immense fields of ice at certain heights above the sea.

The Survey of the so called long “sea-bridge” (Havbroe), which was supposed to range along the coast of Norway, is finished, and shows that the Jutland bank stretches west and north to about  $61^{\circ}$ , but is separated from the Norwegian bank by a channel nearly 200 fathoms deep; that the fishing grounds between Stat and Christiansand are not so distant from the coast as was supposed, and are completely separated from the Jutland bank; and hence the tradition of the existence of a continuous submarine bridge between the coast of Norway and the Continent is a fable. These banks prove to be, in fact, as every geologist would *à priori* suppose, the representations, under the sea, of the detached “Osar” of the Swedes and the Skjærgaarden of the Norwegians, as seen in the water-worn gravel ridges of the present continent of Scandinavia.

*Denmark.*—Whilst our honorary associate, Admiral Zahrtmann, has presented to us the third volume of the Expedition round the World, undertaken, under the direction of the late King, by the Danish frigate ‘Galatea,’ commanded by Captain Steen Bille, I must particularly call your attention to the labours of a kindred Society, which has arisen under the special auspices of the late and present sovereigns of Denmark.

The Royal Society of Northern Antiquaries has most successfully

rescued from oblivion memorials of the highest interest to every archæologist, and data to which historical geographers attach great value;\* and we have now been appealed to by that Society to participate in labours, which they have generously extended to our own islands. They recently sent two of their associates, Professor Munch and Mr. Worsaae, amongst us to explore our North British and Irish antiquities; and as a result, the Northern Society now announces a new and critical edition of the Sagas, relating to the former inhabitants of the Orkneys. As the Earl of Ellesmere, one of our members, distinguished for the union in his own person of literature with geography, has translated the Preface to this work, and explained its contents, I hope that others will join with me in following his Lordship's example, and become members of a Society, which is occupied in throwing light on the history of the common forefathers of Scandinavia and the British Isles. This modern union will form a "sea-bridge" between two countries, united by many ties and sympathies, as binding as any treaty; and it is gratifying to observe that our Vice-Patron, Prince Albert, has already assisted in its formation by inserting his own name in the list of founders.

*Prussia and adjacent parts of Germany.*—The genius of Humboldt continues to enlighten mankind from the terrace of Sans Souci. A new volume of the 'Kosmos' has appeared; but as it pertains to the higher walks of astronomy, I must wait for the concluding volume, which will return to things terrestrial, before I venture to take a view, however imperfect, of the results of this remarkable effort of the veteran philosopher, to whom our age owes its greatest advances in philosophical geography.

Our eminent medallist Ritter has printed his second part of the Geography of Palestine, which will be completed in a third volume. Professor Berghaus has published a third part of his 'Geographical Annals' (or *Geographische Jahrbücher*), and a second edition of his great Physical Atlas. The last-mentioned work is justly considered in Germany as the graphic illustration of the 'Kosmos' of Humboldt, and in this country we have been made acquainted with its great value through the labours of Mr. Keith Johnston and Mr. Petermann.

M. Adolf Erman, our gifted correspondent, has produced an Essay on the Temperature of Springs, with other works, among which is an able sketch of the geographical advantages derivable from such an exploration of north-eastern Asia as that recently proposed by

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\* Among their geographical works see "*Aperçu de l'Ancienne Géographie des Régions Arctiques*," 1847 (with maps). Rafn's labours are most valuable.

Lieut. Pim. I cannot allude to that region, and to M. Adolf Erman, without expressing my earnest hope, that the concluding volumes of this energetic traveller, which treat of Kamschatka, may, like the first volume, be soon translated into English; for, unquestionably, it is one of the most valuable, original, and instructive geographical works of modern times.

In map-making M. Fromme has produced a new physical atlas, and the Prussian Government has added ten new sheets to its surveys (none of which, I regret to find, have been presented to us). Dr. Keipert, of Weimar, having published a new map of Hungary, is preparing two large maps of Central Asia and Turkey; and M. Ravenstein, of Frankfurt, has brought out an original map of the country around that city. My old friend, that sound geologist and miner, M. Henri von Dechen, has just published an elaborate octavo volume, in which are enumerated the altitudes of several thousand localities in the Rhenish province of Prussia.\*

*Bavaria.*—Whilst a sixtieth part only of Scotland has been mapped, and a large portion of the northern counties of England are yet unsurveyed, Bavaria has almost completed her beautiful topographical map, consisting of 113 sheets, on a scale of 1·28 inch to the mile, of all her territories to the east of the Rhine, under the superintendence of General von der Mark, the successor of General von Bauer. Of this great national atlas, eight sheets of the country on this side of the Rhine only are unpublished, and even during the past year several portions of the Palatinate have been completed. A general atlas of Bavaria, in 15 sheets, is also in preparation, as well as a large Geological Map of the Bavarian Tyrol, by M. Schafhäütl.

As I happen to know that the admirable sheets of our own Geological Survey of Great Britain and Ireland, conducted by Sir Henry T. De la Beche (the result of the united labour of many hands and heads), have been presented to the Bavarian Government, may we not hope that the works of all the geologists who have examined the Bavarian Tyrol and the adjacent tracts, shall, like those of our own survey, be digested into a true principle of classification, before geological colours be applied to the very varied rocks of that complicated and metamorphosed region? In truth, a map cannot be called geological which, like a general one of M. Schafhäütl (of which we have received a sample), represents masses, known to be of the same geological age, under different colours, expressive chiefly of their litho-

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\* Sammlung der Höhenmessungen in der Rheinprovinz, von Dr. H. von Dechen. Bonn, 1852.

logical variations. A map so coloured may be curious, and even valuable, as a petrographical index, and as the result of minute labour; but is foreign to that methodical arrangement on which geological order can alone be founded.

*Switzerland*.—In speaking of the progress which has been made in the topographical survey of Switzerland, I would specially direct your attention to four sheets of the cantons of Appenzell and St. Gallen, which M. Ziegler, of Winterthur, who has drawn and executed them, has just presented to us. They form part of a survey on the same large scale of  $2\frac{1}{2}$  inches to a mile, or  $\frac{1}{250000}$ , which is also in the course of application to the cantons of Zurich and Schaffhausen. To give full effect to *these four sheets only*, M. Ziegler passed *six consecutive summers* in the mountains and valleys of St. Gallen and Appenzell, the geometrical measurements of which had been made under the direction of M. Eschmann. The inspection of the results will, I am sure, lead any of you who have studied map-making to agree with me, that they are samples of a fidelity to nature which has rarely been attained. M. Ziegler soon found (M. Leopold von Buch and M. Escher von der Linth being his counsellors) that every class of rock has a peculiar “*facies*,” and hence he became convinced, that no really good topography can be made by surveyors who neglect geological data. Thus, in these sheets the eye of a geologist at once seizes the rugged escarpments of slaty rocks, the undulations of limestone, or the bosses of conglomerate or nagelfluë; whilst, from personal inspection of a portion of the difficult region here represented, I can truly say, that I never yet saw a map more completely ready to receive the colours of a field geologist. The lights are all thrown in perpendicularly, so that the defects of the maps of Geneva and Vaud, as proceeding from oblique shading, are avoided, and the altitude of each terrace, valley, or mountain top is inserted in numbers on a most exquisitely finished lithographic relief. I am authorized by M. Ziegler to say, that, if the large scale of  $2\frac{1}{8}$  inches to a mile had not been determined upon, he could have delineated as effectively all the same features on a scale of about  $1\frac{1}{2}$  inches to the mile. In these works we perceive at a glance the value of good hill-shading; and when the map of the magnificent mountain of Sentis, which stands out to the low countries of Germany as the great sentinel of the Swiss Alps, is forwarded to us, you will see in it how perfectly such a work may supersede the want of any model whatever.

The largest part of the cantons of the Grisons and of Tessin has been surveyed; but detailed maps of this mountainous region are still

wanting, as well as those of large portions of Berne, which are constructing on the scale of the general Swiss map directed by General Dufour, or  $\frac{1}{100000}$  inch to the mile. It is much to be regretted that the scale of these Swiss maps varies in different cantons. In the mean time we are much indebted to M. Ziegler for a small, useful, general map of Switzerland, which he has published, and which will, I am assured, be soon coloured geologically by Professor Studer of Berne, whose acquaintance with the structure of the Swiss Alps is more extensive than that of any other living geologist.

Our library has been enriched by a panoramic view of the Alps, taken from Coligny, north of Geneva, by Professor Chaix, our able correspondent of that city, who has obligingly communicated to us an account of the progress of observation in Switzerland, and the corrections of positions and heights of mountains as determined by trigonometrical survey.

*Austria.*—Excursions not unfrequent with hammer in hand, have long made me familiar with the excellence of the maps executed by the Imperial Geographical Institute of Austria, and Englishmen were gratified last year by seeing the fine execution of many of these works in the Great Exhibition of Industry. As geographers, we have been fortunate in being honoured with a presentation of a series of productions which justly obtained one of the Council Medals of that Royal Exhibition; and on our part we have testified our sense of the intelligence which guides the military survey of Austria by electing its distinguished director, Lieut.-General Skribanek, an Honorary member of our Society. Of these works, which have been so greatly admired and appreciated in England, the large map of the environs of Vienna, on a scale of  $\frac{1}{144000}$ , the hills being in lithograph relief, and the cultivated land in colour, and a map of Europe showing the application of printing in colour, are now suspended on our staircase. Our library is also copiously enriched by other works from the same source, consisting of the already published sheets of the new topographical Map of Central Italy in 49 large sheets, which, though lithographed, have almost the strength of copperplate; of the Lombardo-Venetian States in 14 sheets, on the scale of  $\frac{1}{86400}$ ; of Moravia and Austrian Silesia in 19 sheets; of Bohemia in 38 sheets, on a scale of  $\frac{1}{144000}$ ; and also of the Tyrol and Vorarlberg, and of Styria and Illyria.

Some of these productions are the result of long labours in the field, and others indicate the high interest which the young Emperor of Austria feels in every improvement in our science, including extended astronomical operations, observations, and surveys; the whole

having been conducted by a special corps of geographical engineers under the direction of scientific officers of the Imperial army.

I must indeed add, in justice to the surveying and mapping labours of the Austrians, that, with the exception of Piedmont, Tuscany, and Naples, many parts of the peninsula of Italy might long have remained unknown to geographers without the continuous application of the Imperial engineers. Thus, not satisfied with the production of the fine maps of the Venetian and Lombard States, followed by those of the duchies of Modena, Parma, &c., the Imperial Government has actually completed the survey of Tuscany and the Papal States. I am further assured, that several sheets (on a scale of about  $\frac{1}{10}$  inch to the mile) are already engraved of the last-mentioned territory, whose geographical condition has been more benighted than that of other European countries. We may therefore hope that the time is fast approaching when the geologist and the antiquary may be better enabled to delineate the structure of the subsoil, and the scenes of the ancient glory of Rome.

Of the progress made by the geographers of Sardinia in the north, and of Naples in the south of Italy, I hope to speak at the ensuing anniversary.

In the mean time I am happy to announce, as coming from the pen of our correspondent Eugenio Balbi, the second part of the well-condensed small work, entitled '*Nuovi Elementi di Geografia*,' which will doubtless be of great use to his Italian countrymen. It is gratifying to see the son following in the footsteps of the father, and thus completing and carrying out a work which our lamented foreign member, Adriano Balbi, had hoped to terminate, and which, from its comprehensive arrangement, is worthy of our deceased associate.

*Belgium.*—Those who wish to know how copious is the list of excellent geographical works in the kingdom of the Belgians must consult the rich catalogue of our Member M. Vander Maelen; for it would exceed my limits if I were to attempt to enumerate even the chief of these materials. I will, however, specially call your attention to a geological map of the kingdom which is in course of publication by my distinguished friend M. Dumont of Liege, whose power in unravelling the curvatures of subterranean strata, and in showing their successive outcrops at the surface, is almost unrivalled.

*Holland.*—That good maritime geographer and correspondent of this Society, the Chevalier Jacob Swart, has forwarded to us the whole of his valuable work, the Dutch Nautical Magazine, and two sheets of a new Chart of the seas north of Macassar. He also announces that he is preparing a new Directory of the Archipelago of the Moluccas, and

that the government of the Netherlands has decided on the execution of a large Map of the State in 64 sheets, as well as of a general Geological Map of the Kingdom.

The Zuider Zee has also been minutely surveyed for the first time, and the chart, in a single sheet, was published at Amsterdam in 1851.

*France.*—Our contemporaries of France have officially reported to us, through M. Jomard and M. de la Roquette, that the Geographical Society of Paris has this year awarded its large silver medals to the African travellers, Livingston, Oswell, Rebmann, and Krapf, and to the Arabian explorer Wallin, stating at the same time that honourable mention has been made of our countrymen, Thomson, Hooker, Strachey, Cunningham, Stokes, and Brunner, and of the American Squiers, for their researches in the Himalaya, New Zealand, and Central America.

Such a shower of medals and praise is a specimen of foreign invasion, for which we are much indebted to our good friends on the other side of the Channel.

Allusion will here only be made to the operations of the French Government at and near home; the researches executed by Frenchmen in South America or distant countries being noticed in other parts of this discourse.

*French Maps and Charts.*—During the past year the Dépôt de la Marine has published several important works connected with hydrography, including charts of the Pacific, of the south of France, the shores of the Mediterranean, &c. &c.

The best perhaps of all the publications of the Dépôt de la Marine is that of three new charts of the coasts of Italy, and one of the island of Gorgona, from the elaborate surveys of Messrs. Duperré and Begat, embracing the seaboard from the Gulf of Spezzia to the Canal of Piombino. During next year and the following the survey of the Italian coast will be carried as far as the Neapolitan frontier, where the labours of the French surveyors will probably terminate. A portion of the Ligurian coast of the west of Italy will only then remain to be surveyed, which it is the intention of the French Government to complete.

Besides its charts, the Dépôt de la Marine has published a new volume of the Nautical Instructions for the Coasts of France, to accompany the ‘*Pilote Français* ;’ a series of sailing directions by Capt. Kerhallet for the Azores, the Canaries, and the western coast of Africa, in examining which this well-known officer was for several years engaged; and three very useful volumes on the winds, currents,

&c., of the Atlantic, Pacific, and Indian Oceans. The Society is indebted to the Dépôt de la Marine, through its distinguished director, Admiral Mathieu, President of the Geographical Society of Paris, for the possession of these valuable works.

Soon after the occupation of Algiers the French Admiralty directed an accurate survey to be made of the coast of that country by Admiral Berard and M. Dortet de Tessen; but between the point where it ceased at the Zafarina Islands, and the Straits of Gibraltar, a very large extent of seaboard required examination, including the northern coast of the empire of Morocco. This survey is about to be confided to Captain Kerhallet, who will be accompanied by one of the best hydrographical engineers of France, M. Vincendon Dumoulin, who acted in the same capacity during the last voyage of circumnavigation with the late Admiral Dumont d'Urville.

The activity of the Dépôt de la Guerre has gone on increasing during the past year. Seven sheets of the great Military Map of France appeared in 1851, making 149 out of 258, of which it is to be composed, already published: of the sheets that remain, the engraving of several is far advanced, and, until their completion, it is expected that 12 will be published annually. At present nearly 60 officers of the staff are employed in the operations connected with the survey; and to show how our neighbours manage such matters, it may be stated, that since the survey was commenced in 1818, 2250 officers have been employed on it—*i.e.* in the geodesic and topographical operations alone, which are only confided to persons of education like themselves. The annual vote for the expenses of the survey, engraving, &c., does not exceed 30,000*l.* It is, I may add, calculated that the whole of the geodesic and topographical operations will be completed in 1855, and that before 1860 the engraving of this great monument to geographical science will have been completed.

It may here be mentioned that Col. Peytier, now director of the Topographical Department at the Dépôt de la Guerre, whilst employed in the French expedition to the Morea, surveyed the whole of the present Hellenic kingdom. The results have just appeared in the form of a very beautiful map of Greece, in 30 sheets, engraved on stone.

Connected with the topographical surveys carrying on by the French, during their occupation of Rome and its territory, let me state that it has been found necessary to re-determine the length of the base line, measured by Boscovich in 1780 on the Via Appia, and that Commander Rozet, an officer of the staff corps, an able geologist and sur-

veyor, has received a mission for that purpose from the director of the geodesic operations at the Dépôt de la Guerre.

*Spain and Portugal.*—In the year 1850 I presented to the British Association at Edinburgh the first true general sketch of a geological map of Spain, as prepared by my fellow-labourer in Russia and elsewhere, M. Ed. de Verneuil; and I may now state that he is at present labouring hard in that country. At our next anniversary, I hope, indeed, to have it in my power to indicate the advances which are being made in positive geography in a peninsula which may be justly proud, not only of producing so large a proportion of the early discoverers of the New World, and of the modern route to India, but also of having given us in these days most eminent geographers: among these, is Don Pascual Madoz, the author of the ‘Diccionario Geografico-Estadistico-Historico de España.’ The addition of this most important work (with the maps constructed by M. de Coello) to our library has most properly been specially dwelt upon by the Council.

The new feature in Portugal within my knowledge which has the greatest interest, is the very graphic and detailed topographical delineation of the wine districts of the Douro and Alto Douro, engraved under the direction of our associate, Mr. J. James Forrester of Oporto, and presented to us by him.

#### SOUTH AMERICA.

Among the contributions to the geography of the South American continent, the work of our Vice-President, Sir Woodbine Parish, on the Provinces of the Rio de la Plata, holds a very important place. Professing to be the second edition of a former book, it is in reality almost a new work, from the great quantity of valuable fresh matter it contains on the geography, statistics, natural history, and geology of this portion of the world. Several additions have been made to the map by Mr. Arrowsmith, drawn for the former edition, founded upon recent discoveries; and Mr. Petermann, by whom it has been executed under Sir W. Parish’s direction, has added two sections, of much value to physical geographers, of the continent from the Pacific to the Atlantic, and from Buenos Ayres to Cuzco, based on the barometrical observations of Messrs. Miers, Bauza, Redhead, Pentland, &c.

Four new sheets of M. Gaye’s maps of the provinces of Chili have been published since our last anniversary—viz. Maypu, Santiago, Aconcagua. Three sheets more will complete this important general map of the entire Republic. In the mean time, our thanks are due to

M. Gaye for the manner in which he has executed the topographical and geographical parts of the work confided to him, and to the Chilian Government for the encouragement and support it has extended to the author in the publication of his researches on the history, geography, and natural history of its favoured territory.

M. de Castelnau, who had already published the narrative of his journey from Rio Janeiro to Peru, and thence down the Ucayali and Amazon to Pará, has recently commenced the publication of a set of illustrations to accompany it. The four fasciculi that have appeared contain several itinerary sketch-maps of the countries traversed, but on perhaps too large a scale. There are also some geological sections; and the author promises a series of drawings of the ancient monuments of Peru.

Our countryman Dr. Weddell, a relation of the celebrated navigator, and who now fills the place of Assistant Botanical Professor at the Jardin des Plantes in Paris, had returned to the Andes of Bolivia in 1850. During his second stay there, he visited the auriferous district of Tipuani, and navigated some of the rivers descending from the eastern slopes of the Bolivian Andes, whose course was little known. He has also fixed barometrically the height of some very elevated passes in the Eastern Cordillera. Dr. Weddell, who accompanied M. de Castelnau, and who wrote an interesting volume on the southern provinces of Bolivia, is now engaged in drawing up an account of his last journey, an abstract of which he read at the last annual meeting of the Geographical Society of France.

#### ASIA.

*The Himalaya, Tibet, and Hindostan.*—That part of Asia, to which Englishmen attach deep interest, as constituting the northern frontier of our Indian possessions, which geographers revere as the loftiest region of the earth, and which it has been the ambition of Humboldt through life to visit in person, has in the last few years been most successfully explored.

It was for these reasons that I rejoiced in seeing one of our gold medals adjudicated to the person among that band of recent travellers in the Himalaya range, who has been the surveyor of a large portion of it. But having given due honour to the constructor of a new map of so very difficult and inaccessible a region, and having alluded to the labours of the brothers Strachey, I must not omit to do justice to others, particularly to Dr. Hooker and Dr. Thomson, to whose progress one of my predecessors, Mr. W. J. Hamilton, formerly

adverted;\*—travellers who, in extending our knowledge of the range on its eastern, western, and northern extremities, are about to publish their illustrations of the physical features, meteorology, and vegetation of the mighty Himalaya.

Dr. J. D. Hooker, who inherits the botanical eminence of his father Sir William, has examined the central portions of the chain, which, throwing out the Sikkim mountains, including Kinchinjunga, as a southern spur, extend between the 27th and 28th degrees of north latitude to the frontiers of Tibet. This naturalist has prepared two maps, which will soon be published: one of them will indicate his travels in the Khassya and Jyntea mountains between the Burram-pooter of Assam and the plains of Bengal, including the towns of Sylhet and Jyntea on the south, and Nurtung and Nunklow on the north; the other will embrace the whole of the Sikkim Himalaya, E. Nepaul, with the adjacent provinces of Tibet to the north. In travelling eastward to Nepaul, our traveller ascended the Tambur branch of the Arun to Tibetan passes 17,000 feet high, and explored the courses of several rivers as well as of glaciers and moraines.†

Among many other researches, Dr. Hooker traced the course of all the Sikkim rivers to their sources in Tibet, and examined glaciers and moraines at heights extending to 19,000 feet, determining that the Arun River, which rises in Tibet (west of Turner's Lakes), flows for 100 miles to the south-west before entering Nepaul.

When joined by Dr. Campbell in the autumn of the same year, Dr. Hooker entered Tibet, and twice ascended Bhomtso (18,400 feet), having Kinchinjunga (28,178 feet) in full view to the south-west, and Chumalari (23,930 feet) to the south-east.‡ What geographer does not envy the botanist who, in that sublime position, observed angular heights of the surrounding peaks, the highest in the world? The imprisonment of the travellers Hooker and Campbell, by a faction of the Court of Sikkim, during two months, did not take place till after they had properly satisfied themselves of the same fact, which Captain H. Strachey and others had ascertained in the more central and eastern parts of the chain—viz. that the country of Tibet, to the north of the snowy Himalaya, is no plain nor plateau, but presents for seventy miles a succession of mountains which, though ranging

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\* Journal of the Royal Geographical Society, vol. xix., President's Discourse, p. lxvi.

† See Map prepared by Mr. Petermann to illustrate Dr. Hooker's Memoir, vol. xx. p. 49.

‡ These heights have been determined by Colonel Waugh, the Surveyor-General of India, and his assistants.

from 19,000 to 20,000 feet in height, with flat narrow valleys between, are wholly uncovered by snow. Unable on this occasion to enumerate all the mountain journeys of Dr. Hooker, still less to advert to those he performed in the lower and hilly tracts at the head of the Bay of Bengal, let me here only say, that he used continually, and with great success, the most delicate meteorological instruments. Indeed, he brought back safe a barometer (a rare feat among travellers), which is now hanging alongside the standard instrument of the Royal Society with an error of only  $+ 0.05$ .\*

Dr. Hooker's general observations on the geographical distribution of plants from low hills to the loftiest mountains, are of the highest interest; shrubby rhododendrons having been gathered at 17,500 feet; grasses, sedges, compositæ, and other tufted herbs at 18,000 feet; and lichens at 18,500 feet above the sea. His other labours, united with those of Capt. Richard Strachey, printed in our volumes and in the *Journal of the Asiatic Society of Bengal*, will enable us to form a tolerably just estimate of the geological structure of the Himalaya; whilst to geographers the maps already alluded to, and which Dr. Hooker never could have executed but for the vigorous measures adopted by the Governor-General, the Marquess of Dalhousie, will, I hope, be published before our next anniversary. He will confirm the statement, first published by Dr. Thomson, and afterwards by Capt. R. Strachey, that the Himalaya mountain ridge of our maps is an imaginary line drawn through certain lofty peaks which, catching all the moisture of Hindostan, retain it in snow and ice; and that these, far from being the real axis, are very distant from it. He will also show, that the central and eastern portions of the chain coincide in their main features with those described by the brothers Strachey to the west of the Lake of Mánasarowar, and that there is no plain (properly so called) of Tibet, though the rivers flow for some distances in broad valleys before they are encased in the mountain gorges through which they escape. Much interest too will attach to the phenomena of glacial action, which Dr. Hooker and Dr. Thomson (of whom I am about to speak) have the materials to illustrate; and I shall be much mistaken if their data will not bear out the inferences long contended for by the school of geologists to which I belong, that all true "moraines" of even the most gigantic glaciers have restricted limits; and, consequently, that no erratic blocks which (unaccompanied by "moraines") have been trans-

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\* Some accounts of Dr. Hooker's travels are given in the *Journal of the Asiatic Society of Bengal*; and his large work is preparing for the press.

ported for hundreds of miles from the source of their origin, can ever have been moved thither by solid terrestrial ice, though they may have been conveyed in floating ice-rafts.

This generalization, and the views I referred to on presenting the gold medal to Captain H. Strachey, are, indeed, in good part derived from, and sustained by the researches of Dr. Thomson. Leaving Major Cunningham, the accomplished director of the Tibet mission, with whom (by order of Lord Hardinge) this zealous botanist traversed the Himalaya from Simla in 1847, he passed to Lé whilst Major Cunningham proceeded to explore the antiquities of the valley of Kashmir,\* and Captain H. Strachey to survey the Upper Indus. Dr. Thomson examined the valley of the Shayuk to Iskardo; and after visiting Rondu on the Indus, re-traversed the whole chain by Kashmir to Jamu in the Punjaub. In his next journey he travelled across the Himalaya, on a hitherto unexamined route, to the Tibetan valley of Zanskar, and thence again to Lé; whence, ascending the Nubra River to the north, and crossing lofty glaciers, as described in our Journal,† he descended into the valley of the Shayuk at Sassar, 15,000 feet above the sea, where vast streams of ice, descending from heights of 23,000 feet, cross and dam up the River Shayuk. From that point, a journey of five days through an uninhabited mountainous country, brought him to the Kara Korum pass of the Kuen Lun Mountains, elevated about 18,500 feet above the sea, and bordering the possessions of Gholab Sing and the province of Yarkand in China. Dr. Thomson's work, now in the press, contains an account of his most adventurous and remarkable journeys during two years; in the last of which, reaching a higher latitude in Tibet than any modern traveller, he determined the great geographical fact, that the Kuen-Lun is simply the northern flank of the Himalaya, as now laid down in the map prepared by Captain H. Strachey.‡ The volumes will also contain some very remarkable geological data, including the discovery of tertiary fossils at heights of from 10,000 to 15,000 feet, and flanking the valleys of the Indus and its tributaries. Such arduous and successful labours will, I am sure, obtain for this enterprising botanist,

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\* Major Cunningham published, I am told, an elaborate and learned account of these antiquities in the *Journal of the Asiatic Society of Bengal*; and I have also been assured that he is a good Tibetan geographer, and has prepared two elaborate maps of the countries he visited, which have only lately arrived in England.

† Vol. xix. p. 29.

‡ See a brief sketch of this discovery, *Journal Royal Geographical Society*, vol. xix. p. 29.

and for the other Tibetan explorers of whom I have spoken, the warm acknowledgments of all true geographers.

As Englishmen, we have, indeed, good reason to be proud of the zeal with which, since the days of Colebrooke, Moorcroft, Herbert, Guthrie, the brothers Gerard, and Trebeck, our countrymen have been rendering us familiar with this chain; and it is satisfactory to know that our member Mr. Vigne, the first of the modern explorers of Kashmir after our medallist Baron Hügel, has been succeeded by Mr. Vans Agnew (so unfortunately murdered at Mooltan) and Lieut. Ralph Young, both of the East India Company's service. These gentlemen, accompanied by our associate Mr. Winterbottom, passed from Kashmir through Hussora to Gilgit, and thence by the valley of the Indus, returning to Kashmir by the Dras; and the result has been placed before you in the map of a region previously unknown.

Although I must not here dilate on the geological data obtained from different parts of Hindostan, I may observe that, as Dr. Andrew Fleming has shown that the salt range of the North Punjab exhibits palæozoic and secondary rocks covered by nummulite limestone, that ridge, however low, may thus be considered the southernmost parallel of the great Himalaya chain, which in several parts, including Kashmir, exhibits a like structure. Whilst the salt of the Punjab lies in a stratum below the mountain (*carboniferous*) limestone of Europe, that is to say, in strata of an antiquity hitherto unknown in Hindostan (*old Red Sandstone*), the coal and iron of the district of Churra Poonjee, or the range of hills which separates Assam and the Burrampooter from the plains of Sylhet, belong (as Professor Oldham writes to me) to the nummulite tertiary formation. These facts demonstrate, what travelled modern geologists well know, that the presence of such minerals is no test of the age of rocks; for a geologist who only knew the British succession would be surprised to find useful coal of the age of the London clay, and rock salt, beneath the oldest carboniferous deposits.

In quitting the consideration of this region, I have to remind you, that an instructive map of the region of Scinde and tracts flanking the Indus has been made, and presented to us by Colonel Neil Campbell, who has recently joined our Society.

*China.*—If a long time is destined to elapse before a good map of China can be expected (for Mr. Gützlaff has left us only undigested materials), we have at least obtained some insight into the interior of this vast empire through the lively volumes of the French missionaries, Huc and Gabet.

Our countryman Mr. Fortune, who five years ago introduced us to

the interior of China, has just issued a very spirited and agreeable, as well as an instructive account of the tea-growing provinces, which indicates that the tea shrub, like the vine (*Bacchus amat colles*), only gives off its finest flavour when planted on the slopes of hills, and in the débris and alluvial soil derived from higher mountains. The zeal of Mr. Fortune, and the skill with which he has not only obtained the finest varieties of the tea-plant, but has also directed its culture in Assam and the north-western provinces of India, must prove of substantial service to our country. In the mean time, geographers have to thank him for a very good account of the habits of the people, and for a graphic delineation of the Bohea mountains, which from his description highly merit the exploration of the geologist. His map exhibits at a glance the geographical distribution of the tea-plant.

*Mandchouria*.—Some light has been thrown on the great northern region of China beyond the Wall called Mandchouria, by French missionaries detached from the head-quarters of the Christian community established in the province of Lia-tong (Moud-ken). One of these, M. de la Brunière, was assassinated; but his course was afterwards tracked by M. Venault, who, after traversing desert lands, descended the Sungari and the Amur, through the country of the long-haired Tatars, to the district of the Kilimi (where La Brunière was murdered), not far from the mouth of the great river Amur, where the Russians had a fort in the 17th century. According to M. Venault, the Russians still often come among the Kilimi and long-haired Tatars for purposes of trade and barter, and some of them are about to build a town at Paolo. Before the treaty of Nerchinsk in 1687, Russia had forts and posts on the left bank of the River Amur; and as the Americans are making efforts to bring about a trade with Japan, the Imperial Government may on its part possibly endeavour to realize the words of the French missionaries, “that Divine Providence may some day make use of the Russians to open out to Christians the northern isles of Japan.”\*

*Borneo*.—Mr. John Crawford, one of our early members, the author of the ‘Embassy to Ava,’ and of a Malay Grammar and Dictionary, brought before us recently a Memoir on the Geography and Statistics of Borneo, the largest island in the world; in this he gave a sketch of its mineral, vegetable, and animal productions, together with an account of its aboriginal inhabitants and its foreign settlers, such as the Malays, the people of Celebes, and the Chinese.

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\* Annals of the Propagation of the Faith, vol. xiii. p. 98, March 1852.

The most remarkable minerals are gold, diamonds, antimony, iron, and coal. The gold produce Mr. Crawford is disposed to estimate at one million per annum ; some 50,000 Chinese being chiefly engaged in collecting it. The coal-fields, as far as they are at present ascertained, are of considerable extent, occurring both on the north and south shores. Among the useful plants, besides those common to intertropical agriculture, is the camphor-tree, *Dryobalanops camphora*, the produce of which sells in China for its weight in silver. In the forests are found the wild hog and the *Bos Sundaicus* ; but the royal tiger, so abundant in the neighbouring islands of Sumatra and Java, and in the Malayan peninsula, is stated not to exist here. A full account is given by Mr. Crawford of the strange manners of the aboriginal inhabitants, far advanced in civilization beyond the usual state of society of the majority of the intertropical people of America, and in some respects above that of the inhabitants of the South Sea Islands, but far below the condition of the chief tribes of Java, Sumatra, and the Spice Islands.

I would here remind you that at the last meeting of the British Association, our medallist Sir James Brooke, the Rajah of Saráwak, directed attention to some additional knowledge that had been obtained of the geography of the extreme north end of the island, including the mountain of Kini balu, the height of which is estimated at 13,698 feet. It appears that Mr. H. Low, Secretary to the Government at Labuan, in Borneo, ascended it to a height of 8500 feet, collected many curious plants, and found that it was wholly composed of gneiss and granite, the lower hills of Borneo being formed of sandstone. From our necessarily circumscribed relation to the inhabitants of the larger portion of this vast mass of land, many years will probably elapse before we are even tolerably well acquainted with the geography and structure of its interior.

*Arabia.*—The south-east coast of this region of the earth, so rich and powerful in former periods and now so desolate, had received valuable illustration from the researches of Captain Haines, whose memoirs are published in the 9th and 15th volumes of this Journal ; and the survey of the remaining parts of the same coast having been completed by Captain Saunders and Lieutenant Grieve, of the Indian Navy, they have now been geographically and geologically described by Mr. Carter, who served as medical officer of the Company's surveying brig 'Palinurus.' \*

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\* Journal Bombay Branch Royal Asiatic Society, January 1851 and 1852.

The geological or anti-historic memoir explains how, in addition to the granitic and other eruptive and crystalline rocks, which prevail so much in Arabia, the author was enabled to detect an ascending order of sedimentary aqueous deposits, the lowest of which is a compact micaceous sandstone, overlaid by strata of the cretaceous period, and these by a very great thickness of the nummulite or lower tertiary formation, surmounted by younger tertiary deposits charged with corals, miliolites, and shells, approaching to and identical with species now living. It is gratifying to me to see how, in Arabia, as in the opposite coast of Africa, in Cabul, Scinde, Northern Hindostan, the Himalaya, Persia, and Egypt, the nummulite rocks form the chief and distinguishing mass; and how they occupy the same place as a true representative of the lower tertiary or eocene series which I assigned to them in the Alps and Apennines in the year 1848.\*

In the Geographical Memoir of Mr. Carter you will find a clear account of the physical features of these parts of the coast which have been recently mapped for the East India Company—all the better delineated, as I think, because he is acquainted with their geological structure; it contains also a lively sketch of such of the inhabitants as he had access to, and a notice of the heights, including a most remarkable vertical face of cliffs 1900 feet above the sea, in the cavities of which the natives live.

Learned geographers will be gratified by this author's comparison of the present features with those described by the author of the *Periplus*, and by Ptolemy, and by the accurate agreement of the distances mentioned by them, particularly of the latter, with the measurements noted by our surveyors. The *Ichthyophagi* of Arrian are still the turtle-fed Arabs of Masira. Some incense ports of the ancient merchants are yet to be traced; and from what is stated as to the similarity of the subsoils and climate of this coast of Arabia and those of the opposite or Somali coast of Africa, it may be inferred that the author and our erudite associate Cooley, who places the chief aromatiferous region of the ancients in the latter country, are equally correct; and that frankincense, myrrh, and cinnamon were formerly brought from both shores.†

After many references to sacred as well as to profane history, Mr. Carter terminates his interesting memoir with a retrospect of the ter-

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\* Geological Structure of the Alps, Apennines, Carpathians, &c., *Journal Geological Society*, vol. v. p. 157.

† See Cooley's '*Regio Cinnamomifera*,' *Journal of the Royal Geographical Society*, vol. xix. p. 166.

rible changes which the Arabians have undergone during the past ages, when the Sabæans were succeeded by the Homerites or Hamyarites, the Persians, the Macedonians, and the Romans, and how with the overthrow of the Hamyaritic dynasty in the seventh century, this people, after embracing Mahomedanism, became one of the most powerful as well as richest nations of the earth. One geographical discovery—the passage round the Cape—destroyed that grandeur, and throwing open the commerce of India to the Europeans by another route, deprived the Arabians of their ancient office. “Aden has been seized,” as Mr. Carter writes, “the old route of commerce between the eastern and western nations has again been established ; but the Arabs are no longer the carriers of that produce. They have become poor and divided among themselves, the religion of Mahomed is disappearing from among them fast, and they are returning to the heathenism and barbarity of their aboriginal state.”

In addition to the intimate knowledge which Professor Wallin, of Finland, had acquired of the interior of this sacred region, the fruits of which we are still reaping, and some of which of the highest value are about to appear in the next number of our Journal, it was the anxious desire of the Council to enable this profound scholar to revisit Arabia for a series of years, and there obtain a deeper insight into the real condition of very large interior tracts still entirely unknown to the civilized world. Arrangements with the Imperial Russian authorities, which were commenced under the presidency of my predecessor, had, I hoped, been concluded in the past year, which would have enabled the learned Finn to have obtained for us an amount of knowledge, which would have done honour to the united efforts of the Imperial Geographical Society and our own. Possessing no funds for the accomplishment of such a purpose, we could only promise to contribute the sum of 200*l.* advanced to us by the Government and the East India Company, adding to it on our part instruments, and procuring for the traveller a free passage, passports, and protection. The President of the Imperial Geographical Society, the Grand Duke Constantine, entered kindly into our views. Permission to travel for six years was obtained for M. Wallin (his salary as a Professor being continued to him while thus employed). The cost of his passage to St. Petersburg and England was to be defrayed, and a sum of money equal to 400*l.* sterling was to have been advanced ; and thus we supposed that all was settled. It now, however, appears that M. Wallin expected a grant of 400*l.* annually, or 2600*l.* in all ; but the Vice-President of the Imperial Society, M. Mouravief, has transmitted to

me a correspondence which clearly shows, that so large an expenditure was never contemplated by the Russian Geographical Society. The project is therefore suspended for the present, and M. Wallin has returned to Helsingfors.

It cannot, indeed, be expected that Russia should contribute more than England towards the execution of a survey, in which our ally is only concerned for the advancement of geography, whilst we may derive both real and scientific advantages from it; and it is therefore to be hoped that the East India Directors and our Government may still think it expedient to defray the cost of an expedition into the interior of Arabia by M. Wallin, who, from long habit, is a child of the desert, and perhaps the only European perfectly qualified by training and knowledge to dispel our ignorance of a land so interesting to the earliest history of mankind.

*Projected new Lines of Intercourse between Europe and Asia.*—At our last anniversary our attention was invited to a bold scheme of Mr. Asa Whitney, of New York, for the construction of a great railroad from Lake Michigan to California and the Pacific, the engineering merits of which it is not within the province of geographers to discuss. I have, however, little doubt that, if that sagacious man could have obtained possession of the territory on Lake Michigan, whence, as a starting-place, his fuel, wood and stone for the use of the railroad were to be derived, he could have successfully advanced a line of rails across the fertile prairie-grounds to the west (a noble field for emigration), and thus perhaps have founded a new state between Michigan and the Rocky Mountains; though the time might be distant before a complete chain of such intercourse with the Pacific could be established. Mr. A. Whitney endeavoured to show that, whilst a line across North America is much the shortest road to the richest countries of the East, no good results could follow from cutting a canal across the isthmus of Central America; inasmuch as, besides the maritime dangers of the Gulf of Mexico, the distance to Hindostan and China is 600 miles shorter by the Cape of Good Hope than by passing through any part of Central America; and hence he not only was opposed to all Isthmus speculations, whether canals or railroads, but he also endeavoured to prove that no such intercourse between the two coasts of America would be of use to the inhabitants on either side of that continent. It is, however, to be noted that, under any circumstances, such an opening must be very advantageous to our flourishing colonies of Australia and New Zealand.

Since that time, Captain Syngé, R.E., has brought before you, in a clear and able manner, a patriotic project for traversing North America within the British boundaries. His plan, as far as the author's own knowledge of the country goes, is a well methodised and digested calculation or estimate, of a scheme, of which Major Carmichael Smyth, Mr. Nicolay, and others, have for some time been the zealous advocates.

There can be little doubt that, in reference to the eastern portion of this region, or the Canadian provinces, great shortening of distance and much national advantage must follow from the execution of the proposal respecting the construction of canals or railroads. Again, the facilitation of transport towards the west as far as Lake Superior, by the scheme of the author, may be looked at with much interest as being of value in a commercial point of view ; for in these matters an acquaintance with the country and the application of good engineering skill may be depended upon. But, when we endeavour to realise in imagination the formation of a great line of useful water intercourse between Lake Superior and the Pacific, or a new railroad, within those distant British territories, it seems to me that we must first have a complete survey of that region placed before us. The water project might, indeed, be compared to that by which Peter the Great united the head-waters of the rivers of Russia, and thus produced a net-work of communication through his empire. But in that case numerous peoples already located, had long felt the want of such an intercourse as was effected, by canals cut through soft, rich subsoil, and in tracts where the watersheds were separated by very slight elevations only. To the north-west, however, of Canada, we enter upon a region of hard granitic rocks, for the most part sterile, through parts of which the waters escape by rapids, where the portages are difficult and considerable, and where the differences of level have yet to be ascertained. The Earl of Selkirk and Dr. Rae, both well acquainted with it, have assured me that this country, in which the Hudson's Bay Company hold their far-insulated stations (which would be benefited by any such line of intercourse), offers very few spots, indeed, adapted for any sort of cultivation ; and that, being occupied by Indians and wild animals only, it presents obstacles almost insurmountable to the opening out of any commercial route through it. Again, to reach the Pacific by any line of canal carried westwards across the Rocky Mountains seems to be a remote contingency, in the absence of new geographical data respecting a region little explored since the days of Mackenzie in the last century. Far be it from me, however, to discourage the

patriotic projects of Major Carmichael Smyth and Captain Synge, relating to new works in the Canadas, which, as above stated, seem to be full of use and promise.

In the mean time intelligence reached me a few weeks ago of a proposition made to Congress by Mr. Ragan, a citizen of Natchitoches, whereby it is proposed to turn off a portion of the waters of the Mississippi where joined by the Missouri, and carry them northwards into Michigan and the great lakes, thus opening out a complete line of water carriage between the Rocky Mountains and the Atlantic, and saving the capital of Louisiana from its occasional inundations. But these grand speculations of the engineer need not further occupy our attention on the present occasion.

If we are not destined in our day to see the maritime commerce between Asia and Europe carried on across America, speculations have been revived for opening the line of the Euphrates. It is now contended that the best and shortest communication between England and Hindostan will be by railroad to Trieste, thence by steam to Beyrout or Seleucia,\* whence passing by land to Bir, on the Euphrates, the traveller will thence descend in river steamers to the Persian Gulf, and thus reach Bombay by a much shorter route than that of the overland journey across Egypt. On this latter point I must refer you to the elaborate work of our distinguished associate Colonel Chesney for full information respecting the navigation of the Euphrates. If the Ottoman Government should be powerful enough to maintain a steady and safe transit from Beyrout to Bir, all difficulties may vanish before the will of Englishmen, and the value of time, or the gain of a few days, may possibly bring about a triumph over natural obstacles, and lay out a highway between India and Europe across the wild Syrian desert; thus re-opening the country of Babylon to the traffic of this adventurous generation.

#### AFRICA.

The explorations of different portions of Africa have been continued with such success, that even in the brief space of a year the vast blank on all former maps has been materially reduced. Mr. Oswell, who has just returned to England, and the missionary Livingston, his companion, to both of whom we are indebted for our

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\* A memoir will shortly be read by our associate Capt. W. Allen, R.N., on the capabilities for the restoration of the ancient harbour at Seleucia.

acquaintance with the 'Ngami Lake, have pushed their researches northwards to  $17^{\circ} 25'$  S. latitude and between  $24^{\circ} 30'$  and  $26^{\circ} 50'$  E. longitude, and have traversed a considerable tract watered by deep and constantly flowing streams, which they believe to be feeders of the river Zambesi. We had learned from them that the Zouga, which runs to the east from the lake 'Ngami, is dissipated and absorbed in sands and salt-pans, and now we are told that these travellers passed over a large salt incrustation of about 100 miles in length and 15 miles in width, and saw many others lying to the north of the spot where the Zouga loses itself. Considerably to the north of these great natural salt-pans our countrymen met with a population more advanced in intelligence than most of the tribes of South Africa. They also relate as a striking incident, that shortly before their arrival, the slave-dealers had, *for the first time*, penetrated from the west coast, and through the temptation of gaudy European goods had purchased many children. Seeing that this country of Sebitoane (whose capital Sesheké was watered by a river from 400 to 500 yards wide at the end of an extremely dry season) abounds in many natural productions which might afford a good barter, Mr. Livingston suggests that English merchants might earn a legitimate profit by sending goods thither, and thus check the trade in slaves.

The effort to transfer enslaved people from the centre to the west coast of Africa may, however, be taken as a proof that the odious traffic is diminishing in that region of Western Africa which has hitherto been its head-quarters. On this subject I may refer you to a recent pamphlet published by one of our members, the Hon. Captain Denman, of the Royal Navy, for an excellent summary of the horrors exercised by the King of Dahomey, and for a just explanation of how effectively his tyrannies, slaughter, and capture of the surrounding people, have been checked by the late British victory at Lagos. Every philanthropist must rejoice, that by that exertion of our forces, the defenceless but rapidly improving people which border on the slave-dealing sovereigns of the Bight of Benin have been reassured in their independence;\* and most heartily must we all wish that such haunts of misery as Lagos may be blotted out, and that these resorts of an improving black population which has crowded to Abbeokuta and Yoruba may be rendered marts of productive and honourable commerce.

An active young traveller, Mr. Gassiot, the son of the well-known

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\* See a very instructive chart prepared by Arrowsmith for Viscount Palmerston, showing the extent to which the slave trade on the west coast of Africa had been reduced in 1850.

electrician, has explored both coasts of South Africa to the north of the Cape Colony, but chiefly on the east, and pushed his excursion, under considerable difficulties, through a region occupied by the northern Boers, until he reached the Limpopo river.\* Animated with the same zeal, he had scarcely brought to us his account of what he had seen, than he again departed to visit new regions of South Africa during the next two years.

Mr. F. Galton, to whose researches your attention was directed last year, and who has been absent during two years, has returned with an account of the result of his last travels. Having journeyed about 1600 miles between Walfisch Bay on the south, and Ondonga, in  $17^{\circ} 58'$  S. latitude, near the Nourse river, on the north, and extending his explorations inland to the 21st degree of E. longitude, he has made a very important addition to our acquaintance with the geography of Southern Africa. Through this journey (accomplished entirely at the expense and by the energy of Mr. Galton) we obtain a description of the Damara people, who, though a race of fine stature, are in a low moral state and likely to be extinguished by the more powerful and enterprising Namaquas. The high table-land, which was traversed to reach the Ovampo, is cut through by deep ravines, the chief of which serve as escapes for the periodical floods of the rivers. Like his contemporaries on the eastern side of the African watershed, Mr. Galton passed over a great saline deposit, as if the residue of a desiccated lake, and met with a brackish, a tepid, and a very hot spring.

In delineating the moral character, as well as the physical conformation of the different tribes or nations of South Africa, it is interesting to observe, from the observations of Mr. Galton, how their differences are connected with the form, subsoil, and vegetation of their respective lands. Thus, the arid inland plateaux, covered only with thick jungles and short brushwood, hold the dwarfed and sinewy Bushman; the more open, hilly, and undulating pasture-lands the Damaras, a nation of independent herdsmen, each chief of a family being supreme in his own little circle; whilst the rich corn-lands on the north are occupied by the race which is the most civilized and advanced, the Ovampo. Ondonga, the capital of this people (whose king would not permit our traveller to proceed northwards), is estimated to be about

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\* Another traveller, Mr. Dolman, and his English servant, who had left his companion, Mr. Moyle, have been murdered in an endeavour to join Mr. Oswell and Mr. Livingston; it being supposed that a Hottentot who accompanied them was the assassin. Other English travellers, Capt. Shelley and Mr. Bushe, who were in the same neighbourhood (north of Colesberg) in pursuit of game, went to the spot of the murder.

70 or 80 miles to the south of the great river Amorongo Achilunda, the Nourse of our maps.

This journey, together with other excursions towards the interior of Southern Africa, whether undertaken from the south or from the west, have led us to conclude that, whilst plateaux of some altitude fringe the coasts and advance some distance into the interior (rising, as in the Dammara country, according to Mr. Galton, to heights of about 5000 and 6000 feet above the sea), the more central country, instead of being a mountainous region, is a watershed of little greater elevation, whilst the most central region of all is of no great altitude, and is occupied by a succession of lakes, of which 'Ngami is the southernmost.

This is an important addition to our previous knowledge, one to which Mr. Galton's researches, in addition to those of Oswell and Livingston, have largely contributed; and when their memoirs are prepared for publication, accompanied as they will be by a number of astronomical observations which fix the longitude and latitude of many places, I do not doubt they will be found worthy of your warm approbation. In the mean time I will say that English gentlemen like Mr. Galton and Mr. Oswell, who accomplish at their own cost such results, have already won our hearty thanks.

It must be here stated that in the North of Africa our French contemporaries have done much good service. The publication of the work of Messrs. Galinier and Ferret, two French officers who visited Abyssinia in 1841-42, has been continued; and the fasciculi which have appeared during the past year contain, I am told, several maps of interest, especially one of a portion of that country founded on their own observations, two plans of the environs of Adde Hedout and of Adde Custo, besides a map of the southern portion of the Hedjaz. The zoological and botanical illustrations to the travels of Messrs. Galinier and Ferret are very beautiful.

M. Antoine d'Abbadie, as I am informed by Mr. Pentland, having employed Dr. Götze, a resident of Altona, to calculate the astronomical and geodesical observations made during his residence in Ethiopia, has commenced the construction of a map of the parts of those countries visited by him. He is also about to publish a catalogue of Ethiopian manuscripts at the Imprimerie Nationale, towards which the French Government has liberally contributed, by causing a new set of Ethiopian types to be cast for the work.

The Dépôt de la Guerre, at Paris, has published maps of the provinces of Constantine and Oran on a scale of  $\frac{1}{4000000}$ ; of the environs

of Algiers and Bona on a scale of  $\frac{1}{200000}$ ; and the Dépôt de la Marine has engraved plans of the ports of Bizerta and Collo.

Whilst it gives me great pleasure to observe that some of the views of the veteran African geographer Mr. M'Queen, in reference to Central and Southern Africa, as formerly laid down upon a map, have been sustained by modern researches, it will soon, I doubt not, be unnecessary to refer to Portuguese or any other old authorities; though I am assured by his Excellency Count de Lavradio, now accredited to our Court, that, if the archives at Lisbon were thoroughly searched, much more information would be obtained as to the interior of Africa from the records of the former exploits of our ancient allies. In the mean time, though many years may elapse before speculation can be set at rest in relation to large portions of the interior, whether derived from old or modern travels, I am glad to say that our desire to obtain a more extensive acquaintance with the region of Central Africa as opened out by Park, Denham, and Clapperton will, I trust, soon be gratified by accounts from those very enterprising German travellers, Barth and Overweg, who by the last advices were at the eastern end of Lake Tchad.

Our member, Lieutenant J. L. Macleod, R.N., has made a proposal to ascend the Niger *with the rising waters*, and, if circumstances should permit, to cross to the Gambia, and descend that river; and his plans, having been carefully examined by a Committee of our Council, have been favourably reported on. He has since had an interview with the First Lord of the Admiralty, and hopes are entertained that this zealous officer's proposed expedition may be carried out. In enterprises of this nature too much stress cannot be laid on the preliminary acquaintance of the projectors with the difficulties of climate which they will have to overcome; and as Lieutenant Macleod has served six years on the African coast, and has devised a very ingenious method of applying a steam launch to the ascent of the Niger, we may reasonably hope that such an expedition might succeed in throwing light on new sources of trade, as well as in defining more accurately the nature and outlines of that region. We may, indeed, attach the more importance to this scheme, as it is warmly supported by the Chamber of Commerce of Manchester, and by our energetic associate Mr. Macgregor Laird, who is quite ready to fulfil his part of the contract with Her Majesty's Government, and direct the ascent of any navigable river on that coast by a steamer capable of carrying goods and passengers.

*Comparative View of Africa in Primeval and Modern Times.—*

Geographers will be gratified to learn that a map of South Africa, compiled by our learned associate Mr. Cooley, and extending from the equator to 19° S. latitude, is about to appear under the execution of Mr. Arrowsmith. With such a valuable document, and with the map of the whole of the Cape Colony, we shall soon have before us a general sketch of the physical features of a large portion of this quarter of the globe. So much, however, has our knowledge increased by the valuable original map of the Cape Colony made upon the spot by Mr. Hall (of which Mr. Arrowsmith is preparing a reduction), that we are, as I will now endeavour to show, almost entitled to speculate on the prevailing structure of Africa being similar to that of its southernmost extremity.

In support of the general view to which I now call your attention, I must state that it has been suggested to my mind by the explanation of the geological phenomena of the Cape Colony by Mr. A. Bain. This modest but resolute man, having been for many years a road surveyor in the Colony, had, in all his excursions, collected specimens of the rocks and their organic remains; and, gradually making himself acquainted with the true principles of geology, he has at length traced the different formations, and delineated them on the above-mentioned map. In this way he has shown us that the oldest rocks (whether crystalline gneiss or clay-slate, here and there penetrated by granite) form a broken coast fringe around the Colony from the southern to its western and eastern shores, and are surmounted by sandstones which, from the fossils they contain, are the equivalents of the Silurian or oldest fossil-bearing rocks.\* These primeval strata, occupying the higher grounds, of which the Table Mountain is an example, and dipping inland from all sides, are overlaid by carboniferous strata, in which if no good coal has yet been found, it is clear that its true place is ascertained; and as Mr. Bain has detected many species of fossil plants of that age, we may still find the mineral pabulum for the steamers which frequent these coasts.

Above all these ancient strata, and occupying, therefore, a great central trough or basin, strata occur which are remarkable from being charged with terrestrial and freshwater remains only; and it is in a portion of this great accumulation that Mr. Bain disinterred fossil bones of most peculiar quadrupeds. One of the types of these, which Professor Owen named *Dicynodon* from its bidental upper jaw, is a representative, during a remote secondary period, of the lacertine associates of the hippopotami of the present lakes and waters. The

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\* Mr. Bain himself so styles these rocks in the Map deposited in the Library of the Geological Society.

contemplation of this map has therefore led me to point out to you how wide is the field of thought which the labours of one hard-working geologist have given rise to, and to express, on my part, how truly we ought to recognize the merits of the pioneer among the rocks, who enables us, however inadequately, to speculate upon the entirely new and grand geographical phenomenon, that such as South Africa is now, such have been her main features during countless past ages, anterior to the creation of the human race. For the old rocks which form her outer fringe, unquestionably circled round an interior marshy or lacustrine country, in which the *Dicynodon* flourished at a time, when not a single animal was similar to any living thing which now inhabits the surface of our globe. The present central and meridian zone of waters, whether lakes, rivers, or marshes, extending from Lake Tchad to Lake 'Ngami, with hippopotami on their banks, are, therefore, but the great modern, residual, geographical phenomena of those of a mesozoic age. The differences, however, between the geological past of Africa and her present state are enormous. Since that primeval time the lands have been much elevated above the sea-level—eruptive rocks piercing in parts through them; deep rents and defiles have been suddenly formed in the subtending ridges, through which some rivers escape outwards, whilst others flowing inwards are lost in the interior sands and lakes; and with those great ancient changes entirely new races have been created.

Travellers will eventually ascertain whether the basin-shaped structure, which is here announced as having been the great feature of the most ancient, as it is of the actual geography of Southern Africa (*i. e.* from primeval times to the present day), does or does not extend into Northern Africa. Looking at that much broader portion of the continent, we have some reason to surmise, that the higher mountains also form, in a general sense, its flanks only. Thus, wherever the sources of the Nile may ultimately be fixed and defined, we are now pretty well assured that they lie in lofty mountains at no great distance from the east coast. In the absence of adequate data, we are not yet entitled to speculate too confidently on the true sources of the White Nile; but, judging from the observations of the missionaries Krapf and Rebmann, and the position of the snow-capped mountains called Kilmanjaro and Kenia (only distant from the eastern sea about 300 miles), it may be said that there is no exploration in Africa, to which greater value would be attached than an ascent of them from the east coast, possibly from near Mombas. The adventurous travellers who shall first lay down the

true position of these equatorial snowy mountains (to which our Abyssinian Medallist, Dr. Beke, has often directed public attention), and who shall satisfy us that they not only throw off the waters of the White Nile to the north, but some to the east, and will further answer the query, whether they may not also shed off other streams to a great lacustrine and sandy interior of this continent, will be justly considered among the greatest benefactors of this age to geographical science!

The great east and west range of the Atlas, which in a similar general sense forms the northern frontier of Africa, is, indeed, already known to be composed of primeval strata and eruptive rocks, like those which encircle the Cape Colony on the south, and is equally fissured by transverse rents. As to the hills which fringe the west coast, and through apertures of which the Niger and the Gambia escape, we have yet to learn if they are representatives of similar ancient rocks, and thus complete the analogy of Northern with Southern Africa. But I venture to throw out the general suggestion of an original basin-like arrangement of all Africa, through the existence of a grand encircling girdle of the older rocks, which, though exhibited at certain distances from her present shores, is still external, as regards her vast interior.

Let me, therefore, impress on all travellers who may visit any part of Africa, that their researches will always be much increased in value, if they bring away with them (as I have just learned that Mr. Oswell has done) the smallest specimens of rocks containing fossil organic remains, and will note the general direction and inclination of the strata.

With no region of the old world have we been till very lately so ill acquainted as Africa. But now the light is dawning quickly upon us from all sides; and in the generation which follows, I have no doubt that many of the links in the chain of inductive reasoning, as to the history of the successively lost races of that part of the globe, will be made known, from the earliest recognizable zones of animal life, through the secondary and tertiary periods of geologists. Passing thence to the creation of mankind and to the subsequent accumulations of the great delta of the Nile, we have recently been put in the way of learning what has been the amount of wear and tear of the upland or granitic rocks, and what the additions to the great alluvial plain of Lower Egypt, since man inhabited that almost holy region, and erected in it some of his earliest monuments.\* But how long will it be before we

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\* See the account of the instructive suggestions of my friend Mr. Leonard Horner, to ascertain the amount of the successive deposits in the lower valley of the

shall be able to calculate backwards by our finite measure of time, to those remote periods, in which some of the grandest physical features of this continent were impressed upon it, when the lofty mountains from which the Nile flows were elevated, and when the centre of Africa (certainly all its southern portion) was a great lacustrine jungle, inhabited by the *Dicynodon* and other lost races of animals?

*Conclusion.*—If I ought, Gentlemen, to apologize for the length to which these observations have been carried, you will, I know, excuse the individual whose chief anxiety has been to do his duty to you, and to the grand subject retrospective and prospective which has been placed before him.

The only desire now left for me to express is, that your future volumes may again expand to the dimensions they attained in those days when, in the ardour of our pursuit, we forgot that our means were not as national as our objects. But now, the real *vis geographica* being revived, it is accompanied by such an increase of income that we can certainly publish, and do justice to every good memoir which may be submitted to us.

In truth, the twenty-one volumes of the *Journal* are the records of the dignity and usefulness of this Society. For although they contain some papers to which rigid critics may object as not coming strictly within our domain, it must be recollected that in a Society constituted like our own, the tastes and pursuits of many individuals who look at geography after their own manner, must be consulted; and thus it is that neither our numbers nor our spirit can be maintained, if our publications do not embrace ancient as well as modern geography, occasional descriptions of the produce of newly-discovered lands which may be useful to the mercantile community, and accounts of the habits and languages of distant people.

On the other hand, the pure physical geographer will rejoice to see that we have been accumulating valuable meteorological and astronomical data, which will form a good element in the construction of future publications, which we may now hope to see strengthened by the help of one of the leading terrestrial magneticians of the day, who has recently joined us.

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Nile, as given in the *Edinburgh Philosophical Magazine* of July, 1850. Mr. Horner informs me that the researches are now going on vigorously on the site of Memphis, having been already applied to the site of Heliopolis; our Consul-General in Egypt, the Hon. C. Murray, taking a lively interest in their progress. The recently published *Journal* of our member, Capt. Peel, R.N., to Darfur, will well repay the perusal of the geographer from the number of good observations of positions it contains, and the best levelling of the Nile between Khartoum and Cairo.

Our volumes have, indeed, always seemed to me to be attractive and valuable, particularly as works of reference, precisely in the ratio of their varied composition. In them the scholar finds conveniently bound together stray leaves nowhere else to be met with, which explain or illustrate the classical writers of antiquity in the countries of Greece, Asia, and Egypt. Some of the most valuable of these have proceeded from the pens of our military associates, and others from surveying naval officers; so that, whatever may be the result of the new system of warlike education, it is gratifying to one who, like myself, can count back to the old stirring times, to appeal to works of many, whose attainments in learning were acquired under the régime of a Nelson and a Wellington.

Whilst this class of works has proved that the branch of our science which is comparative, necessarily involves an union of ancient lore with modern appliances, and whilst our auxiliary the Hakluyt Society is annually bringing to light the slightly known or hidden writings of the earliest discoverers of America and the Indies, we may well be satisfied with the copious stream of knowledge which we have endeavoured, at our own cost, to pour out annually concerning lands unknown to our ancestors.

Seeing, then, the spirit which animates Englishmen, and makes them such ubiquitous and undaunted travellers, I can have no doubt that at many ensuing anniversary meetings there will be laid before you lists of trophies as numerous as on the present occasion, and that thus our countrymen will continue to sustain the onward career of the Royal Geographical Society.

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*Postscript.*—Whilst the last sheet of this discourse is undergoing a revise, I learn to my great satisfaction that the screw-schooner the *Isabel* will still be employed in the good cause of the search after Franklin, and more particularly in an endeavour to ascertain the fate of the crews which are supposed to have abandoned the two vessels seen floating on an iceberg (see p. lxxvi. *et seq.*). That spirited officer, Commander Inglefield, R.N., having received the vessel from Lady Franklin and the subscribers, has undertaken at his own risk and expense to complete the enterprise; and sailing early in July, he will, if possible, first visit Jones's and Smith's Sounds, and afterwards examine the west coast of Baffin's Bay and Labrador. Dr. Sutherland the naturalist, who was formerly with Captain Penny, will accompany Captain Inglefield; and Mr. Abernethy, who was ice-master in every British expedition, Arctic and Antarctic, of this century, has also engaged himself in this noble enterprise.—25th June, 1852.